South African Medical Journal
Suid-Afrikaanse Tydskrif vir Geneeskunde

Vol. 24, No. 52 Cape Town, 30 December 1950 Weekly 2s

ELECTROKYMOGRAPHY

A PRELIMINARY REPORT

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In 1945 Henny and Boone first reported a new method of examination termed electrokymography. Since then a good deal of valuable information has been published by the same authors in active collaboration with Chamberlain of Philadelphia.

The electrokymograph was specifically designed for the graphic registration of the movements of the heart and its vessels, utilizing the fluoroscope and the electrocardiograph. The apparatus consists principally of a roentgen-ray sensitive pick-up unit and its power supply.

The pick-up unit, an R.C.A.-931-A photomultiplier tube, is enclosed in a lead case with an aperture measuring 5 × 20 mm. Behind the aperture and inside the casing is placed a small fluorescent screen with its light-emitting surface facing the photo-sensitive surface of the photomultiplier tube. The pick-up unit is mounted on the patient's side of the fluoroscopic screen of the roentgen unit. The long axis of the aperture is placed at right angles to the point on the contour of the heart to be examined, the unit being so placed that the central beam passes through the centre of the aperture. The photo-multiplier tube is activated with light of varying intensity in accordance with the movements of the heart border; this causes a varying degree of absorption of the roentgen rays under the aperture.

In our studies at Pretoria, a Sanborn Electro-kymograph and Stethocardiette have been used for the simultaneous recording of heart border motion and heart records, the simultaneously recorded heart sounds being used as a comparative curve for timing the waves of the electrokymogram.

TECHNIQUE

The galvanometer of the Stethocardiette is turned on and standardized as for electrocardiography. The roentgen unit is set as for ordinary fluoroscopy, and the patient is placed on the table, either in the sitting or supine position. The power supply for energizing the pick-up unit is then turned on. The crystal microphone for picking up the heart sounds is placed over the praecordium and held in position with an elastic strap. The room is darkened as for ordinary fluoroscopy. The heart is viewed on the fluoroscopic screen with the photo-multiplier tube in the central beam. The aperture of the photomultiplier tube is so adjusted that its long axis lies parallel to the direction of motion of the part to be studied. It is covered by the heart to about half its extent.

The diaphragms of the roentgen unit are closed down until only the pick-up unit can be seen. The volume control of the electrokymograph is slowly turned up, so introducing the signal into the galvanometer of the Stethocardiette, and the heart sounds are again checked. The amplitude on the galvanometer is controlled by the volume control of the electrokymograph.

The patient is told to hold his breath in the mid-phase of respiration and the Stethocardiette camera is started. After a good tracing of several heart cycles has been obtained, the camera is stopped. The volume control of the electro-kymograph is turned down; the roentgen shutters are opened and the pick-up device is moved to the next place desired and the same procedure repeated.

The amplitude of the movements of the heart is not recorded by this method. The swing on the galvanometer is dependent on many factors, among which are:

1. The intensity of the roentgen beam;
2. The potentiometer setting (which must necessarily be varied according to the patient's permeability to roentgen rays);
3. The volume control of the electrokymograph.

The polarity of the apparatus is so arranged that the rise in the curve represents diminished intensity, i.e. decrease in light. Therefore a rise in the curve represents outward move-ment of that part of the heart border which is being examined.

Over 100 patients have been examined, approximately one third of them having cardiac disease. Their ages varied from seven to 63 years.

The descriptions that follow are based on the findings in normal cases. Almost all cases were examined in both the supine and erect positions.

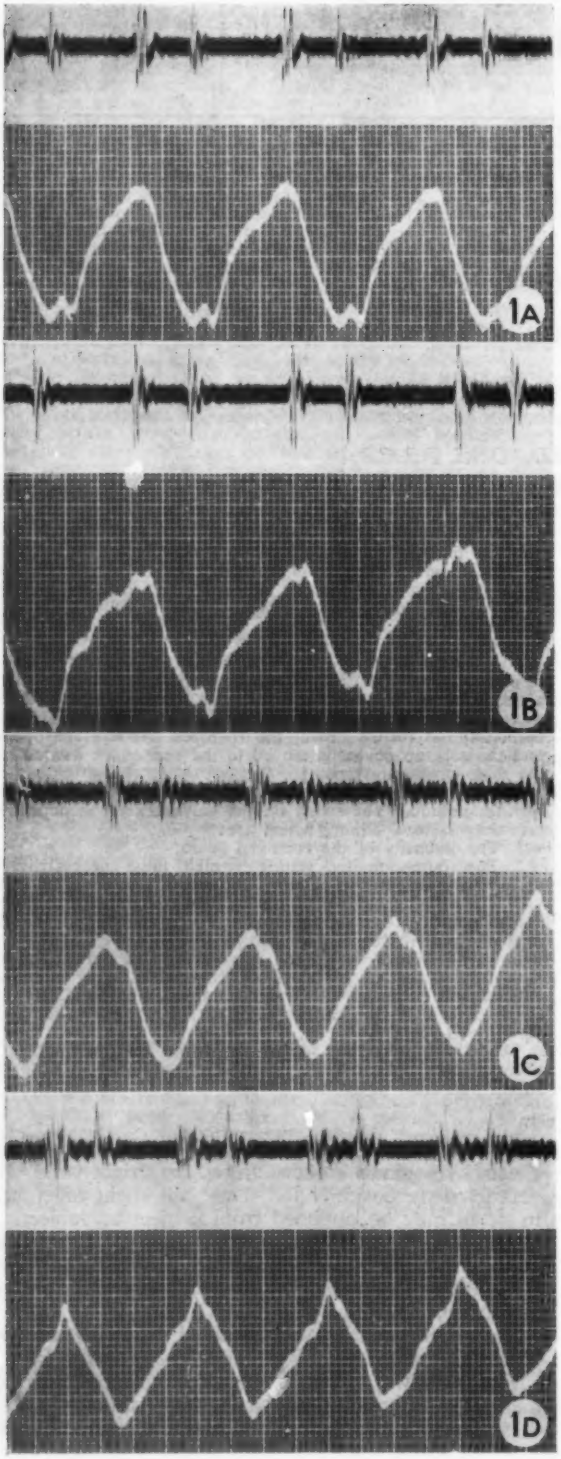
THE VENTRICLES

Electrokymograms taken from the right and left ventricles are basically the same, but slight differences in detail may be obtained from subject to subject.

The left ventricle was studied over the left border of the heart in the postero-anterior projection and over the posterior border in the left anterior oblique projection.

The right ventricle was studied over the anterior border in the left anterior oblique projection.

Fig. 1 shows typical tracings recorded over the left and right ventricular borders. Approximately 0.1 to 0.15 second before the large vibration of the first sound



there appears a sharp rise in the curve due to completion of ventricular filling by atrial systole. With the first large vibrations a short descent or negative wave is seen. This is possibly due to positional change of the border during the isometric contraction phase. It may not always be present and may merely be represented by a flattening of the curve.

Towards the end of the first sound, the curve descends sharply due to a medial movement of the border during the ejection phase, the latter part of this descending limb showing a gradual slope.

With the first vibrations of the second sound the curve rises for a short distance and then falls producing a positive wave before diastolic filling takes place and the curve again rises.

This small positive wave, occurring during the second sound, is thought to be due to positional shifts of the ventricle during the phase of isometric relaxation, and it is not always present.

With the opening of the a-v valves, the curve rises, at first rapidly, corresponding to the rapid filling phase and then more gradually until the onset of atrial systole.

THE ATRIA

The right atrium was studied over the right border in the postero-anterior position and with the patient rotated 10° to the left.

The left atrium was studied over the posterior border in both the first and second oblique positions.

Atrial electrokymograms usually consist of a basic pattern of two or three waves. Considerable variation can, however, occur in their details, probably as the result of the activity of the ventricles and surrounding large vessels like the pulmonary artery and veins.

The effects of the ventricles and large vessels may vary from subject to subject and on different segments of the same atrium. It would appear that the ventricular influence is greatest the nearer the edge forming part of the atrium lies to the annulus fibrosus and the ventricle.

Commencing with atrial systole (Fig. 2) one sees a negative wave or a sudden sharp slope in the terminal portion of an already existing descending limb. This portion of the curve occurs synchronously with the atrial portion of the first sound. Corresponding to the first large vibrations of the first sound one may see a small positive wave, possibly due to the bulging of the a-v valves during isometric contraction.[10]

The descending limb of this positive wave is due to the descent of the a-v septum during the ejection phase. Atrial filling soon supervenes and the curve rises during ventricular systole.

Fig. 1.

1A represent the tracing obtained over the apex of the left ventricle in the P.A. position.
1B represents the curve midway up the left ventricle in the P.A. position.
1C was obtained from the posterior border of the left ventricle in the left anterior oblique view.
1D represents the curve usually obtained when examining the right ventricle in the R.A.O. view.

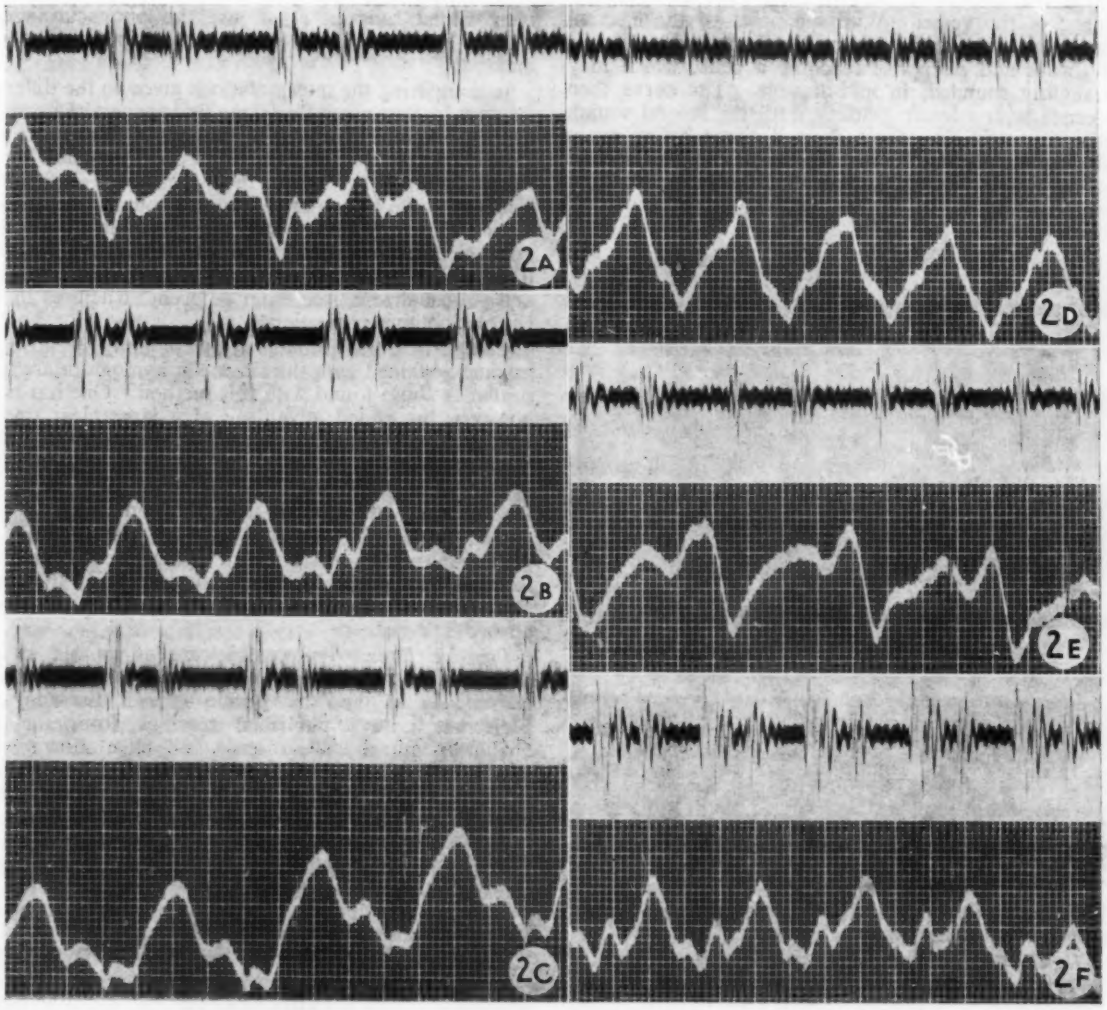


Fig. 2.
2A, B and D represent typical tracings obtained over the left atrium in the R.A.O. position.
2C was obtained over the left atrium in the L.A.O. position. 2E and F were obtained over the right atrium in the P.A. position.

After the second sound, usually at a point thought to correspond with the opening of the a-v valves, the curve descends, until ventricular filling supervenes and the atrium rides outwards on the expanding ventricle until atrial systole once again causes a descent. This influence of ventricular filling does not, however, always manifest itself, and the curve may descend rapidly at first, during the rapid filling phase, and then more gradually until atrial systole causes a sharp descent.

THE ARTERIES

Electrokymograms recorded over the aortic knob, ascending aorta and pulmonary artery closely resemble the carotid sphygmogram.

The aortic knob and pulmonary artery were studied in the postero-arterior projection in most cases, while the ascending aorta was studied in the left anterior oblique projection. Occasionally it was necessary to rotate the patient into the right anterior oblique position for the recording of the pulmonary artery electrokymogram.

One cannot differentiate these three tracings from one another by their appearances only.

The aortic knob tracings (Fig. 3) occasionally show a small positive or negative wave associated with the first vibration of the first sound. This wave, when present, usually appears about 0.04 second before the major ascending limb and is possibly due to positional

change of the vessel. With the onset of the ejection phase, i.e. towards the end of the first sound, there is an abrupt and steep rise reaching a peak, which may be slightly rounded, in mid-diastole. The curve then descends with a lesser gradient until the second sound, when it usually rises for a short distance before again falling gradually until it reaches the base. This second rise may simply be a flattening of the curve and not an actual wave.

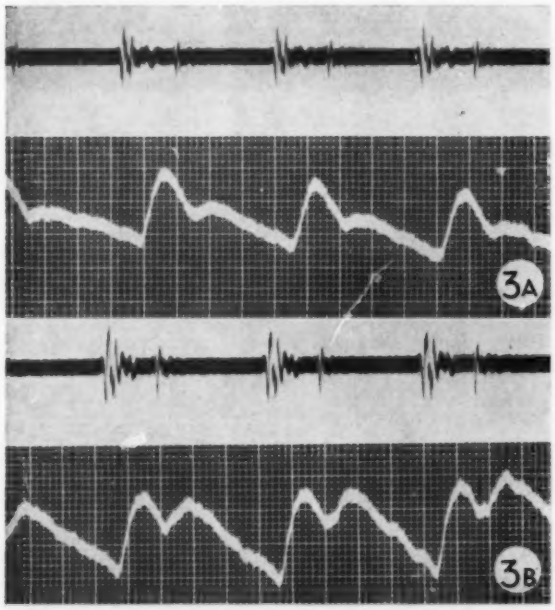


Fig. 3.
3A was obtained in the P.A. view over the aortic knuckle and 3B over the pulmonary artery.

This incisura on the descending limb corresponds to the dicrotic notch of the carotid sphygmogram.

The incisura is usually at a high level in aortic knob tracings and nearer the base line in pulmonary artery curves.

The pulmonary artery curves usually show rising and falling limbs of more equal gradient.

COMMENT

The description given above is for the most common type of curve found, and no attempt has been made to describe all the differences in detail which may occur in electrokymograms of the various chambers and vessels.

The tracings depicted above are similar in type to those published by other workers.[1-9]

Boone *et al.* usually use the carotid sphygmogram for timing their tracings, with the occasional use of electrocardiography.

Andersson uses the electrocardiogram almost exclusively whilst Luisada *et al.* use the phonocardiogram and have suggested the term fluorcardiography for their method.

In comparing the interpretations given to the different tracings by various authors one finds general agreement in their opinions excepting in tracings of the left atrium. Here Andersson [1, 2] and Luisada *et al.*[6-8] commit themselves and show what they consider true atrial tracings; while Boone *et al.*[9] do not commit themselves, stating that they find it difficult to obtain 'pure' left atrial electrokymograms in normal subjects. They find it difficult to be certain that this chamber is in silhouette and to visualize it free from adjacent structures in the various oblique projections.

Comparison with Standard Kymography. Ventricular tracings obtained with the single slit kymogram are very similar to those found with this method. One has here, however, the added advantage of a large clear tracing and the synchronously recorded heart sounds or other tracings described above. These synchronously recorded 'timers' and the clarity of the tracings add greatly to the accuracy and ease of interpretation.

One may, with this method, by use of multiple photo-multiplier cells, record simultaneous tracings from as many chambers or great vessels of the heart as is desired. In fact, this has already been accomplished.[9]

Possible Uses. Its possible use as an aid in the diagnosis of myocardial infarction is suggested by Luisada *et al.* and by Boone *et al.* Luisada and Fleischner [8] have published tracings from the left atrium in mitral valve disease and have shown what they consider to be tracings typical of mitral incompetence. They suggest that electrokymography may be used as an aid in the diagnosis of doubtful cases.

Its physiological usefulness is self evident and with multiple pick-up units it may be possible to depict asynchronism of ventricular action.

The authors wish to acknowledge their thanks to the C.S.I.R., which made this study possible by means of a research grant.

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VAN DIE REDAKSIE

VEILIGHEIDSKODE VIR DIE MEDIESE GEBRUIK VAN X-STRALE EN RADIUM: S.A. BURO VIR STANDAARDE

Die toenemende gebruik van X-strale en radium het vir gebruikers daarvan die behoefte aan beter beveiligings- en beskermingsmaatreëls teen bestraling meegebring. Die gevare wat deur oormatige blootstelling ontstaan, is in party gevalle goed bekend en in ander gevalle nog onseker. Die ondervinding het egter afdoende bewys gelewer dat die bekende gevare vermy kan word wanneer behoorlike voorsorgmaatreëls getref en voorsiening vir geskikte werktoestande gemaak word.

Die beskermingsmaatreëls en -prosedures wat in die kode * beskryf word, is opgestel om bestraling onder normale werktoestande tot waardes binne die toelaatbare blootstellingstempo te verminder.

Aangesien dit die algemene mening is dat baie bestaande X-straal-installasies in Suid-Afrika nie van voldoende beskermingsmiddels voorsien is nie, word dit ten sterkste aanbeveel dat persone aan die hoof van X-straal-toerusting weer aan die hand van hierdie aanbevelings hulle eie installasies moet ondersoek. Die kode dek die toepassing, die maksimum toelaatbare dosis, werktoestande, algemene aanbevelings, beskermingsaanbevelings in sake X-strale, elektriese voorsorgmaatreëls in X-straalkamers en beskermingsaanbevelings in sake radium. Verder bevat die aanhangsels in verband met die beskermende waardes van boumateriale 'n nomogram om die looddiktes vir beskerming te bepaal en 'n radiumbeskermingskaart ten einde die doeltreffende gebruik van die kode te vergemaklik.

Raad in verband met beskerming en inspeksie kan by die Suid-Afrikaanse Buro vir Standaarde ingewin word.

Gebruik van hierdie kode word spesiaal aanbeveel vir ongereelde gebruikers van X-straaltoerusting wat natuurlik minder ondervinding opgedoen het in die gebruik daarvan. Daar word aan die hand gedoen dat die aanbevelings van hierdie kode die grondslag behoort te vorm van enige regulasies wat liggame na goeddunke mag opstel aangaande X-straal- en radiumapparate onder hulle beheer.

* Eksemplare van die Veiligheidskode vir die mediese gebruik van X-strale en radium, wat deur die Raad vir Standaarde gepubliseer is, is nou by die Suid-Afrikaanse Buro vir Standaarde, Privaatsak 191, Pretoria, teen 5/- per eksemplaar, posvry, verkrygbaar.

EDITORIAL

SAFETY CODE FOR THE MEDICAL USE OF X-RAYS AND RADIUM: S.A. BUREAU OF STANDARDS

The increased use of X-rays and radium has brought about the need for better safeguards and rules to protect users from radiation. The dangers arising from overexposure are in some cases well known, in others, still uncertain. Collated experience, however, has shown conclusively that, with reasonable precautions and suitable working conditions, the known dangers can be avoided.

The protective measures and procedures described in this code* are designed to reduce the radiation, under normal operating conditions, to values within the permissible dosage rate.

Since it is generally considered that many existing X-ray installations in South Africa are not provided with adequate protective measures, it is strongly recommended that persons in charge of X-ray equipment should re-survey their own installations in the light of these recommendations. The code covers application, maximum permissible dose and working conditions, general recommendations, X-ray protective recommendations, electrical precautions in X-ray rooms, radium protective recommendations. Appendices covering protective values of building materials, a nomogram for determining lead thickness required for protection and a radium protection chart, are designed to facilitate the successful operation of the code.

Advice concerning protection and surveys may be obtained from the South African Bureau of Standards.

The use of this code is especially recommended to occasional users of X-ray equipment, who are liable to be less experienced. It is suggested that the recommendations of this code should form a basis of any regulations which organizations may wish to promulgate with respect to X-ray and radium sets under their control.

* Copies of the Safety Code for the Medical Use of X-rays and Radium published by the Standards Council are now obtainable from the South African Bureau of Standards, Private Bag 191, Pretoria, at a cost of 5/- per copy post free.

AGE DETERMINATION

CONFLICTING EVIDENCE PRESENTED BY ANATOMICAL AND RADIOLOGICAL DATA OF THE SKELETON

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In a recent appeal case dealing with illegal immigration, the age of an Indian youth was in question. The law allows children up to the age of 16 years to enter the country, provided they are members of a family already settled in the Union.

It was alleged that the boy must have been over 16 years of age at the time of entry, and the prosecution supported their case by radiological evidence showing that the epiphysis of the medial epicondyle at the elbow joint had already fused to the shaft. Anatomy textbooks (Gray, 1949; Cunningham, 1943) state that this epiphysis in the male unites to the shaft between the ages 18-21, and it was therefore argued that the youth must have been well over 16 when he came to South Africa. The defence, supporting its case by a birth certificate issued in India, maintained that the boy was under 16 at the time of immigration. The medical evidence in support of the defence argued that the youth may well have been under 16, since it is stated by one particular authority (Flecker, 1932) that the union of the medial epicondyle epiphysis to the shaft can occur as early as 12 years, and that the majority fuse about the age of 16 in males. The defendants won their case and the court ruled that the youth had entered the Union in a lawful manner.

The medical evidence for the two sides should not have been so glaringly contradictory. The prosecution used radiological evidence of age but appears to have interpreted the data anatomically. The medical assessor for the defence did not make this error. Clearly there are two methods by which evidence of age, based on the union of epiphyses, is obtained:—

1. The *anatomical method* decides by direct examination of the bones whether epiphyseal lines are present or not. If such lines remain visible, that particular epiphysis has not yet fused to the shaft. This method, of course, is only applicable after death.

2. The *radiological method*, the only method available in the living, states whether epiphyseal lines can be seen on the radiograph or not, and thus decides whether the epiphysis is still un-united, or whether it has fused to the shaft.

It must be realized that these are different ways of approach to the problem. Radiological evidence cannot be interpreted on age data collected by anatomists; neither can anatomical evidence of union or non-union of epiphyses be interpreted with the help of age data compiled by radiologists, because the criteria indicating epiphyseal fusion will be shown to be different in the two methods.

In a textbook of medical jurisprudence (Rhodes, Gordon and Turner, 1945) it is stated quite clearly that 'observers who have studied the ages of union of epiphyses by radiographs invariably give very much earlier times of union. The reason is almost certainly that the thin epiphyseal lines which mark the end of the growth period, often do not show on the radiographs'.

Comparatively Early Disappearance of the Epiphyseal Lines at the Elbow, as Revealed by Radiographs. Some years ago a fairly large number of European school children, in the age-groups 13 to 16, was X-rayed by Dr. N. Downes, at that time on the staff of the Anatomy Department. The investigation was limited to the elbow joint. In view of the importance of the elbow in the matter of age determination, a few of the skiagrams of this series are here reproduced. All of them (Figs. 1-5) confirm the observation that 'radiological union' of epiphyses to the shafts of long bones occurs at a much earlier age than one would expect from the information given in anatomy textbooks.

It is recognized by all authorities, whether radiological or anatomical, that epiphyses unite to the shafts at an earlier age in girls than in boys, and this fact is reflected in the short series shown here. For instance, in a girl aged $14\frac{7}{12}$ (Fig. 2) all the epiphyses around the elbow appeared to be fused to the shafts. In a boy, a year older (Fig. 3), three of the epiphyses are still un-united, whilst another boy nearly two years older (Fig. 5) had reached the same stage of epiphyseal fusion as the girl. On account of the differences between the sexes, the periods of fusion are often given separately for males and females.

In Flecker's important article, already referred to, the average age of fusion of epiphyses was determined from an analysis of thousands of radiographs. The author also recorded for most epiphyses the earliest ages at which union to the shaft had been observed radiologically, as well as the latest ages at which the epiphyses had been noted as un-united. The periods of fusion of the four epiphyses around the elbow joint, observed radiologically, are noted by Flecker (1932) as follows:

(a) *Main distal epiphysis of humerus. Earliest age,* $13\frac{6}{12}$ in a girl, $14\frac{7}{12}$ in a boy; *average age* in girls 13, in boys 16; instances of non-fusion have been noted at 16 in both sexes.
(b) *Medial epicondyle. Earliest age,* girl 10, boy 12; *average age* girls 14, boys 16; an instance of non-fusion was noted in a girl aged 16, and in a boy aged 17.
(c) *Head of radius. Earliest age,* girl 13, boy 14; *average age,* girls 14, boys 16; *latest age,* one girl 16, one boy $17\frac{1}{2}$.
(d) *Top of olecranon. Average age,* girls 14, boys 16; *latest age,* girl 16, boy $17\frac{1}{2}$.

It will be seen that the ages of the five subjects (Figs. 1-5) all come within the range of periods of union given by Flecker. If the data presented by the radiographs were accepted as indicating not only radiological fusion of the epiphyses, but also the disappearance of visible epiphyseal lines at the bony extremities, the ages of these school children should also come within the range of 'probable ages', given in anatomical tables of union. However, if we accept this

premise and consult anatomical periods of fusion, we find ourselves faced with completely conflicting information. The 'probable age' of each of these children would have been judged to be 3-4 years more than the actual age. For instance, the medial epicondyle is said to fuse at the 20th year, the other three epiphyses between 16 and 18 (Gray, 1949).

Either the anatomical periods of union are wrong, or the X-ray appearances indicating fusion do not coincide with the disappearance of anatomical epiphyseal lines. The answer is that 'radiological fusion' precedes the disappearance of visible epiphyseal lines, as can be seen in the samples illustrated in Figs. 6-9. The specimens were long bones from individuals with ages near the end of the growth period. Thus we can see that the anatomical periods of fusion are as correct as the radiological ones, but the criteria are different, because epiphyseal lines may remain visible at the extremities of long bones long after evidence of non-union has disappeared on radiographs.

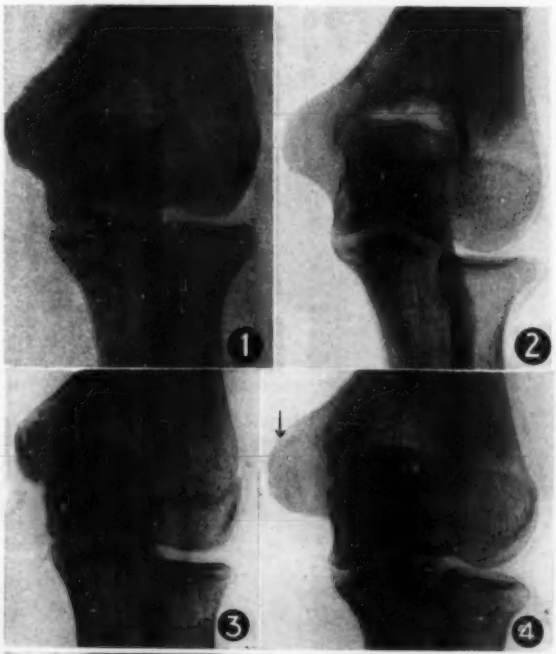

Fig. 1. Radiograph of the elbow joint of a girl, aged 13 years 7 months. The main distal epiphysis of the humerus, the head of radius and the top of the olecranon appear fused to the shafts; the medial epicondyle still shows an epiphyseal line.

Fig. 2. Radiograph of the elbow joint of a girl, aged 14 years 7 months. No epiphyseal lines are seen. All four epiphyses around the elbow appear to be fused to the shafts.

Fig. 3. Radiograph of the elbow joint of a boy, aged 15 years 7 months. Epiphyseal lines are seen clearly. The main distal epiphysis of the humerus, the medial epicondyle and the head of radius have not yet fused to the shafts. The epiphysis at the top of olecranon is doubtful.

Fig. 4. Radiograph of the elbow joint of a boy, aged 15 years 11 months. The main distal epiphysis of the humerus, the head of radius and the top of olecranon appear fused to the shafts; the medial epicondyle is partly united, the epiphyseal line extending a little more than three-quarters of the way.

Fig. 5. Radiograph of the elbow joint of a boy, aged 16 years 2 months. No epiphyseal lines are seen. All four epiphyses around the elbow appear to be fused to the shafts.

DISCUSSION

In the radiographs of young children the epiphyseal cartilages are revealed as fairly broad lines of break in the continuity of the bone, because in childhood the epiphyseal cartilages are comparatively thick plates which lie in a horizontal plane across the longitudinal axis of the long bones. Towards the end of the growth period the epiphyseal cartilages gradually become thinner. Further, near the end of the growth period, these thin epiphyseal plates of cartilage are no longer disposed in a horizontal plane, but have acquired pronounced elevations and depressions which fit into one another. The reason usually given is that such irregularities enable the bones to withstand shocks and jars more successfully, otherwise the epiphysis would be knocked off too easily (Cunningham's *Anatomy*, 1943). A good instance of the irregular outline of the epiphyseal cartilage is seen in Fig. 397 of Gray's *Anatomy* (1949) which shows the head of humerus in section; the epiphyseal contact line in the centre is heaped up towards the epiphysis. The lower epiphysis of the femur illustrated in Fig. 9 separated easily from the shaft after maceration. This showed that fusion had not even commenced in the interior of the bone. The opposed surfaces of the diaphysis and epiphysis were extremely irregular, elevations and grooves on the diaphyseal side dovetailing accurately with corresponding depressions and ridges on the epiphysis.

These various anatomical changes which occur towards the end of the growth period make it more and more difficult for radiography to reveal the existence of an epiphyseal plate of cartilage as a break in the continuity of the bone. The line of the break not only becomes thinner, but its shape becomes irregular, so that continuity in the bony pattern at one level overlaps, and may obscure or even hide a break in continuity at another level. The same problem arises in demonstrating a fracture line when there is no separation of the fragments. Often several radiographs taken in different planes are required before such a lesion is shown.

For some time after the epiphysis has fused to the shaft, the skiagram may show a line of greater density along the plane where the epiphyseal cartilage had been. Such lines are called 'epiphyseal scars' (Cunningham, 1943) and must not be confused with epiphyseal lines. An 'epiphyseal scar' is seen in the radiograph of Fig. 9 at the head of the femur, and the appearances in the radiograph of Fig. 6 suggest an 'epiphyseal scar' in the interior rather than an epiphyseal line.

Added to the above anatomical features we must allow for the superimposition of the soft parts as another factor tending to obscure the display of epiphyseal lines in the skiagrams. In the examples which have been illustrated, the soft part factor did not operate, since the bare bones were X-rayed. With the soft parts of the living person superimposed, the contrast between the anatomical and radiological appearances might well have been still more obvious. For example, it is doubtful whether the epiphyseal line in the skiagram of Fig. 6 would have been revealed; the only suggestion of an un-united epiphysis might have been the little notching on the surface of the bone seen on the right side. Equally, the skiagram of the lower end of the femur in Fig. 9 might have been interpreted as showing that the lower epiphysis had already fused to the shaft.

Fig. 6. Photograph and skiagram of the proximal end of the humerus from a female subject whose age is unknown.

No epiphyseal lines were visible at the distal end of the humerus and the 'probable age' was 21 to 23 years. Note the obvious epiphyseal line at the head of the humerus, but it is becoming bridged over by bone in parts (see left side of photograph).

On the radiograph the epiphyseal line is only just visible and the bony pattern in the interior appears to be continuous in most parts.

As a corollary, we may assume that in many of the bones in Figs. 1-5, in spite of fusion shown in the skiagrams, one would have observed lines demarcating the epiphyses from the shafts, if one could have examined the macerated and prepared bones. There appears to be some difference in the texture of the bone of the epiphysis and of that of the shaft, which shows as a line on the surface for some time after bony union is completed. Examples of such lines of demarcation are seen at the upper end of the femur, shown in Fig. 8, on the medial epicondyle epiphysis in Fig. 7, and at the greater trochanter and head of the femur in Fig. 9. Anatomically such lines are accepted as indicating incomplete fusion, and the age of the person is interpreted accordingly. Thus we can explain the apparent contra-

Fig. 7. Photographs and skiagrams of the proximal and distal ends of the left humerus of a male subject stated to be 23 years old.

At the proximal end note obvious epiphyseal line, also clearly seen on the skiagram. At the distal end an epiphyseal line is still visible at the medial epicondyle, but the radiograph shows this epiphysis fused to the shaft. The perforation above the trochlea is a fairly frequently seen congenital abnormality.

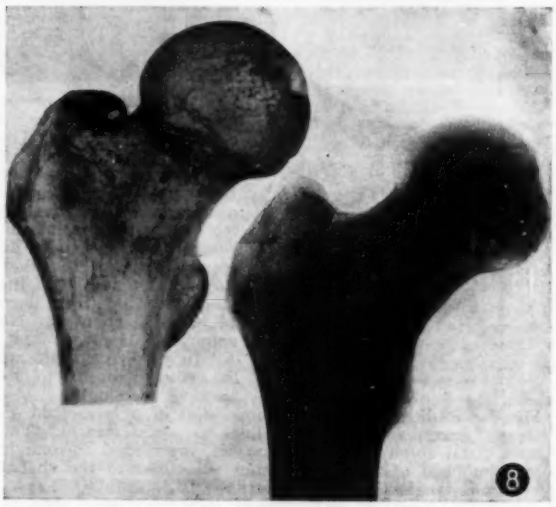

Fig. 8. Photograph and skiagram of the proximal end of the femur of a male subject who was stated to be 19 years old.

Epiphyseal lines are still seen around the head and around both trochanters. On the skiagram, however, the head and the greater trochanter appear fused to the shaft, while the lesser trocha ter still shows an epiphyseal line.

Fig. 9. Photographs and skiagrams of the proximal and distal ends of the right femur from the same subject as in Fig. 7; a male subject stated to be 23 years old.

At the proximal end note that epiphyseal lines are still seen at the head and at both trochanters; the lines have partially disappeared.

On the skiagram the head and the greater trochanter appear fused to the shaft, but an 'epiphyseal scar' is seen at the head. The lesser trochanter is not seen on the radiograph. At the distal end the epiphyseal line is very obvious anatomically, but is only just seen radiologically.

dictions found in anatomy textbooks when radiographs showing epiphyseal fusion are given. For instance, in Plate XIII, Figs. 1 and 2 of Cunningham's *Anatomy* (1943), which are radiographs of the elbow of a girl aged 12, the main distal epiphysis of the humerus is shown united to the shaft. But in the account of the ossification of the humerus it is stated that this epiphysis fuses to the shaft at the age of 14-15 in females, and 19 in males.

SUMMARY AND CONCLUSION

With the help of several radiographs of the elbow joint taken in children whose ages were known, it is demonstrated that it would have been grossly misleading to judge their 'probable ages' by using the data concerning periods of epiphyseal fusion which are given in anatomy textbooks.

The reason for the earlier disappearance of the epiphyseal lines on the radiographs, as compared with that of the epiphyseal lines on the bones, is explained.

Several long bones are illustrated in which epiphyseal lines are visible, when the radiographs indicate that fusion between epiphysis and shaft had already occurred.

In our present state of knowledge, the anatomical and radiographical criteria for age determination cannot be reconciled, and must be treated as separate entities. If in a particular case radiological evidence alone is available, a deduction of 'probable age' must be made on data supplied by radiologists. *Vice versa*, if the actual bones can be inspected, the periods of epiphyseal fusion established by anatomists can be used in order to make a deduction of 'probable age'.

I gratefully acknowledge the help received from a Research Grant of the University of Cape Town, and wish to thank Mr. A. A. Lamb of the Anatomy Department, for technical assistance.

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RETROLENTAL FIBROPLASIA

REPORT OF TWO SOUTH AFRICAN CASES AND A BRIEF REVIEW OF THE LITERATURE

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During the past decade the term 'retrolental fibroplasia' or fibroplastic membrane behind the lens of the human eye, has occurred with increasing frequency in the medical literature. The incidence has been highest in the larger American cities, especially Boston. In South Africa, although both paediatricians and ophthalomologists have been on the alert for the occurrence of the condition, no cases have as yet been reported.

Before proceeding to discuss the salient features of our cases, we would like to point out that some confusion exists about the differentiation between the true bilateral developmental type (which occurs only in

premature infants) and the more frequent unilateral type (found in full-term infants). The unilateral type is the one usually referred to as a 'pseudo-glioma' which indicates a white mass behind the lens and usually results from a chronic ocular infection, such as a metastatic ophthalmitis. It often leads to a mistaken diagnosis of true retinal glioma. We also exclude cases of persistent posterior vascular sheath and congenital falciform fold.

The cases we now describe belong to the first category (i.e. the true developmental type), characterized by a gray pupillary reflex, a retrolental vascular membrane, microphthalmos, shallow anterior chamber, with anterior synechiae (a feature which predisposes to the development of secondary glaucoma), remains of the anterior pupillary membrane, spheroidal lens and searching nystagmus.

CASE REPORTS

Case 1. L. C., a male infant aged eight months, attended at the Transvaal Memorial Hospital for Children because his mother had noticed continual searching movements of his eyes. The baby had been delivered by caesarean section on 24 August 1949 at about the thirtieth to thirty-second week of pregnancy. This was performed on account of severe antepartum haemorrhage occasioned by a central placenta praevia. The infant's birth weight was 2 lb. 6 oz. (1,070 gm.). He was in a critical condition and was resuscitated by use of oxygen, coramine and lobeline. On the fourth day his weight had dropped to 1 lb. 14 oz. (850 gm.). During the first six weeks he was given oesophageal tube feeds of breast milk and oxygen was administered continuously. After the initial loss, weight gain was steady and on the fiftieth day he weighed 5 lb. 1 oz. He was given two blood transfusions of 60 c.c. each on account of marked anaemia.

The consideration of vitamin therapy is important because of recent views of the possible role of vitamins in the aetiology of retrolental fibroplasia. This infant received a multivitamin preparation. The initial dose, given from the eighteenth to the thirty-eighth day contained about 400 units of vitamin A and 100 units of vitamin D daily. This was then increased to 1,600 units of vitamin A and 400 units of vitamin D daily. Other therapy comprised thyroid gr. 1/10 daily, and a mixture containing about 2 gr. of Ferri et Ammon. Cit. daily.

The management of this infant did not differ much from the usual treatment of premature infants adopted at the Transvaal Memorial Hospital. The infant was discharged on the fifty-fifth day apparently well, but no record of examination of the eyes was made.

The mother states that the child developed normally as regards weight and height and also, apparently, in other respects. He lifted his head at the age of three months and sat up at six and a half months. He holds objects in his hands and enjoys playing with a rattle. He has never, however, been noticed to follow light or objects with his eyes. The mother became perturbed three weeks before attending at the hospital because she thought the left eye was lighter in colour than the right. She also noticed persistent roving movements of both eyes.

There are two siblings. One, a female aged seven years, was two months premature, but is now well; the other, a male aged two and a half years, was one month premature and had a hare-lip and cleft palate. Recently the mother had an abortion at five months.

Examination revealed a well-developed infant weighing 18 lb. The skull showed slight plagiocephaly with a high vault. The anterior fontanelle measured $1\frac{1}{4}$ inches by $\frac{3}{4}$ inch and the skull circumference was 17 inches. The heart was not clinically enlarged and there was a grade III systolic murmur maximal in the third and fourth left intercostal spaces para-sternally. The rest of the examination, excepting the eyes, was non-contributory.

The Eyes. Both irides were foetal blue. There was a slight convergent strabismus and roving nystagmoid movements of both eyes. The child did not respond to strong light. Under a general anaesthetic the right eye showed a very shallow anterior chamber. Arising from the edge of the sphincter of the iris were many small strands (obviously gross remnants of the pupillary membrane). Behind the lens was an extensive fibrotic attachment, which showed numerous large vessels coursing over its surface. The left eye showed a localized loss of translucency due to a fibrotic reaction of the cornea, where the iris had made contact, i.e. there was a severe local reaction to an adherent leucoma. The anterior chamber was almost completely obliterated and the pupil was small and eccentric and somewhat occluded, making observation of the white membrane behind the lens difficult. It appeared as if the iris lens diaphragm had been pushed forward by a mass in the vitreous. Examination under a general anaesthetic showed that any attempt at iridectomy would be futile. It was also thought that any attempt to incise the sclera and pull out or cut a window in the dense fibrous membrane behind the lens would be impracticable.

The features described are thus typical of the condition of bilateral retrolental fibroplasia in an advanced and irreversible state. The blood count showed four million erythrocytes per c.mm.; 8,900 leucocytes per c.mm.; neutrophils, 34%; monocytes, 9%; and lymphocytes, 57%. The modified Ide test was negative, and Rh testing showed no sensitization. The serum calcium was 10.8 mg. per 100 ml.; inorganic phosphorus, 4.7 mg. per 100 ml. and alkaline phosphatase 19.1 Bodansky units per 100 ml.

Case 2. H. V., a seven-month-old female infant, was brought to the Transvaal Memorial Hospital because she refused to open her eyes in bright light and had marked redness of her eyes. She had been delivered prematurely, at about the twenty-eighth week of pregnancy, on 8 January 1950. The birth weight was 1 lb. 10 oz. (780 gm.) and the infant received continuous oxygen and breast milk feeds by tube for eight weeks. She was discharged apparently well at the age of three months. The mother felt that the child developed normally in all respects, but that she had never followed objects with her eyes. She had always blinked in bright light, but lately had kept her eyes tightly closed.

The mother had three other children, aged five, four

and two years respectively. All were normal full-term deliveries. She had been perfectly well during this pregnancy until about the sixteenth week, when she had repeated small vaginal bleeds until labour commenced.

Examination revealed a slightly under-nourished infant who held her eyes tightly closed. When the eyes were open, repeated searching movements were evident. There was a small cutaneous angioma about ¼ inch in diameter on the left upper abdomen. The skull circumference was 15½ inches and the anterior fontanelle was almost closed. The rest of the examination was non-contributory.

The Eyes. Examination under general anaesthesia showed, in the left eye, a very shallow anterior chamber. There was a small corneal nebula at the site of contact of the iris with the back of the cornea (adherent leucoma). Small strands, the remains of the pupillary membrane, were seen arising from the iris sphincter. The lens was clear, but a large white opacity was evident in the vitreous behind the lens. The right eye also showed a shallow anterior chamber. The lens was clear and occasional posterior synechiae were seen. Remnants of the pupillary membrane could be seen under magnification and a large retrolental mass, which did not show any vascularity, was evident.

This case is also in a very advanced state and it was considered that any operative treatment was impracticable.

REVIEW OF THE LITERATURE

The condition of retrolental fibroplasia was first described by Terry[1] who discussed the 'fibroplastic overgrowth of persistent vascular sheath behind each crystalline lens' occurring in extremely premature infants. This original report stimulated a wide interest and numerous descriptions of aetiology and pathogenesis have accumulated. Most of these have concerned the disease occurring bilaterally. Occasionally unilateral cases are seen, but they seem to differ from the bilateral ones in that there is no relationship to prematurity. The factor of most significance in the bilaterally occurring cases is the association with marked prematurity. All Terry's original cases were infants under 3 lb. in weight and Hepner *et al.*[2] found that 92% of 66 cases were premature. Gilger[3] stresses the fact that the condition is not related so much to the degree of prematurity as it is to the actual weight of the infant. The other common association is the occurrence of vaginal bleeding during pregnancy. Reese[4] found this in 30-35% of cases and it was a prominent feature in our cases.

The disease process starts at the periphery of the fundus and whatever its primary aetiology and pathology, a fibrotic reaction spreads behind the lens to form a partial or complete retrolental membrane. This active phase is most marked between the second and fourth months post-natally. The rapidity and extent of the process varies considerably, so that in some cases a complete retrolental membrane may form in two weeks. As the condition progresses, the lens and iris become approximated and posterior synechiae form. The iris retains its foetal blue colour. In more severe cases, the anterior chamber becomes shallow or occluded, anterior synechiae form and where the iris approximates the cornea, opacities may appear. The whole eye becomes microphthalmic and glaucoma and cataract may complicate the picture. The prognosis in the fully-established cases is uniformly bad. Some improvement may occur, but vision still remains permanently poor.

The cause of the condition has not yet been established. Terry[5] maintained that it was due to a persistence of the hyaloid system, but there is no evidence at birth of the hyaloid artery or ligament and this view is refuted by Owens and Owens.[6] They state that the first changes occur as dilatations on the blood vessels of the fundus. Swellings on the periphery of the retina are then produced by exudates with retinal detachment. The retinal folds then fuse to form the retrolental membrane. They feel that the disease runs an active course which stops at about four to five months post-natally and is then followed by a contracture stage.

In view of the increase in the incidence of the condition in recent years, they investigated the possible role of massive vitamin therapy in premature infants, in the aetiology of the disease. They thought[7] that high doses of vitamin A which, in chickens, diminished the availability of vitamin E, possibly was of importance and tried the effect of administering vitamin E. In a group of 23 premature infants given alpha-tocopherol acetate, only one developed the disease, whereas in a similar control group of 78 infants, 17 showed signs of the condition. In those with early changes, vitamin E appeared to have a beneficial effect in preventing progression. It is, according to these observers, probably rather a therapeutic effect, as in actual cases of retrolental fibroplasia, vitamin E levels are not low. Vitamin E has no effect if started later than the sixth week of life.

This work is of great interest in view of the modern tendency towards high dosage of vitamin A and D in premature infants. However, Hepner *et al.*[2] could find no definite correlation with vitamin A dosage and indeed, Warkany and Schraffenberger[8] believe that vitamin A deficiency plays a part in aetiology. The latter workers reported changes in the eyes of rats on vitamin A deficient diets.

Other theories of aetiology are mainly concerned with defects of development. Although Terry[9] stated that the incidence of mental deficiency is not greater in children affected with the disease than in normal children, Krause[10] maintains that most are found to be retarded if examined after the age of four years. He states the condition is due to an aplasia of the anterior neural ectoderm. It is difficult, however, to assess the degree of mental development in blind or partially blind children.

Reese and Payne[11] suggested that the condition was due to persistence and hyperplasia of the primary vitreous. They refute Owens and Owens' work and claim that the lesions at the periphery of the fundus are present from birth, but may be overlooked if examination is not carefully done under a general anaesthetic

with the pupils dilated. In favour of a congenital nature of the disease is the frequent occurrence of remnants of the pupillary membrane, which were also present in our cases. Frequently associated are multiple skin angiomata.[1, 11]

Retrolental fibroplasia has not been a common disease until recent years. It appears to be more common in America than in other countries and its incidence is obviously increasing. Hepner *et al.*[2] found, in the period 1937-1945, an incidence of 6.8% in premature infants under 1,600 gm., whereas between 1946 and 1948, this has risen to 30.4%. Terry, in Boston, reports an incidence of 23% in infants under 3 lb. In England, however, in one series of 4,000 premature infants followed to one year of life, only four cases developed (Crasse [12]). Whether the increasing incidence is related to the greater survival of very small infants, has not yet been established adequately, but the condition of retrolental fibroplasia as an important cause of blindness should be recognized.

Treatment of the disease is most unsatisfactory. Surgery is generally contra-indicated. It is suggested that vitamin E be administered to premature infants. If the condition is suspected, deep therapy to the back of the globes might devascularize a vascular membrane and improve or halt the progress of the process. The total dose suggested is about 400-1,000 r.[13]

SUMMARY

1. Two cases of bilateral retrolental fibroplasia are presented.

2. The condition occurs in extremely premature infants, in whom it is an important cause of blindness.

3. The main features are a vascular membrane behind the lens of both eyes, a shallow anterior chamber, remains of the anterior pupillary membrane and a searching nystagmus.

4. The theories of the aetiology of the disease are discussed briefly.

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TICK PARALYSIS IN MAN

A SUSPECTED CASE DUE TO *RHIPICEPHALUS SIMUS* KOCH

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Tick paralysis in man is a well-known disease in a narrow belt along the East Coast of New South Wales and Queensland as well as in similar limited belts in Western Australia; it is also known to occur in the North-Western United States of America and in British Columbia. In Australia, the vector is *Ixodes holocyclus* Neum. In America *Dermacentor andersoni* Stiles and *Dermacentor variabilis* Say are involved and, in one case, also *Haemaphysalis cinnabarina* Koch. From other parts of the world, two cases due to *Rhipicephalus simus* Koch have been recorded by Veneroni (1928) from Somaliland.

Tick paralysis in various kinds of domesticated animals has been recorded from South Africa, Crete, Yugoslavia and some Asiatic parts of U.S.S.R. A short survey is given by Theiler (1949). The veterinary aspects, therefore, are dealt with in this paper only as far as they are necessary for understanding the human problem.

The cause of the disease in man and in animals was an unsolved problem up to a short time ago. Most authors agreed that a specific bacterial, rickettsial or viral agent was not responsible, because transmitting experiments using blood or macerated organs of ill animals always proved to be negative. Furthermore, it was noted that the symptoms subsided a relatively short time after removing the tick-vector.

As a rule, only one female tick, mostly located on or near the head, is responsible for the disease. The features of the disease are, therefore, readily explained if a toxic agent is formed in the tick and injected into the host. Regendanz and Reichenow (1931) supposed that this toxin arises in the growing eggs of the sucking female because they were able to cause similar symptoms of paralysis in animals by injecting emulsified eggs. This 'ixovotoxin' is present in a wide variety of tick-species, probably in all, and it is not specific for those specimens found to cause paralysis. De Meillon (1942)

repeated these experiments and considered it highly improbable that the ixovotoxin is conspecific with the paralysis-toxin since the induced clinical picture was not identical and the ixovotoxin was present in species of ticks not known to cause paralysis.

Recent investigations by Ross and Oxer in Australia (*cf.* Theiler, 1949) seem to bring the problem nearer to a solution. They show it to be highly probable that the toxin is originally formed in the salivary glands and not in another part of the body, as for instance the eggs. Not only the adult females of the Australian paralysis-tick, *Ixodes holocyclus*, excrete the toxin, but also larvae and nymphs of this species. Typical clinical features are, however, only produced by those early instars if they are present in sufficiently large numbers on the experimental animals. The development of the disease in man and animal is, therefore, probably dependent on the amount of injected toxin being many times greater in the larger female than in a male or a smaller nymph or larva. This immunity is dependent on animals being frequently bitten by ticks so that when for one reason or another ticks become rare the immunity decreases.

Only certain species of ticks are able to cause paralytic effects, apparently only certain species or races of animals are susceptible. The paralysis tick of South Africa, for instance, is *Ixodes rubicundus* Neum, (not *I. pilosus* Koch; *cf.* Theiler 1949, p. 37) which is known to produce paralysis in sheep, cattle and the wild vaal-ribbok (*Pelea capreolus* Bechst.) but, as far as is known, in no other wild or domestic animal. No human cases have as yet been recorded, possibly because man is not a suitable host for this tick.

It is questionable if the factors mentioned, namely, species of tick, species of host and degree of host-immunity are the only ones which are necessary to cause paralysis in man and animals. Medical and veterinary reports show that most probably also the localization of the sucking tick may be important, so that a vector attached on the head or near the spinal cord is more dangerous than a tick fixed elsewhere. Furthermore, the physiological condition of the single tick specimen seems to be an important factor. It is obvious that the problem of tick-paralysis has not yet been completely solved.

A critical review of tick paralysis in man is given by Stanbury and Huyck (1945) mainly based on experiences in North America. They quote in detail some clinical records and draw from these the following reasonably accurate clinical picture:

> The patient, usually a young female whose long hair conceals a tick, is perfectly well before retiring the evening prior to onset of symptoms but notices upon rising the following morning that her legs are weak. Locomotion is possible at this stage, and temporary recovery or progression of the disease may occur from this point. With the loss of locomotion there is a rapid progression of ascending paralysis during the next 24 to 48 hours to a point at which the patient is unable to move either arms or legs, and lies quite helplessly in bed. Sphincter function may or may not be retained. Except for possible apprehension the patient appears quite well. There may be vertigo or numbness and paraesthesias of the extremities. Rarely does the temperature exceed 100° F until the terminal stage. Vomiting is occasionally observed. Stiffness of the extremities, restlessness, fatigue, aching legs, and photophobia may be complained of. The beginning of respiratory distress may occur quite suddenly and unexpectedly; when it does it usually leads to a fatal termination. Death may be preceded by convulsions. The mechanism of death is respiratory paralysis. Ascending paralysis with bulbar involvement followed by death characterizes the typical course of the disease unless the tick is found and removed. Indeed, no case is reported where the patient recovered and a tick was found after recovery. Usually, if the tick is removed there is noteworthy improvement within a few hours. If breathing has been laboured it becomes free, and muscular power returns. At times ability to walk is regained in a matter of twelve hours, and almost always within two days. Complete recovery within a week is the rule. In this country, unless the tick was found when the patient was in extremis, recovery has been invariable. There are almost no reports of permanent disability, although Mail and Gregson reported one suggestive case with a permanent weakness of the facial muscles and arms. The authors did not see the patient at the time of her original illness twelve years before, but pointed out that this might have been the result of an old poliomyelitis.
>
> Objective findings throughout the illness are relatively few. The pulse and respirations are not elevated until bulbar signs supervene. The patient's appearance is usually quite normal except for apprehensiveness, although mental cloudiness or stupor may be present. The striking feature of this disease is ascending paralysis. Reflexes are diminished or absent. There may be apparent asynergia and dysmetria, doubtless the result of weakness rather than of cerebellar involvement. The onset of the bulbar involvement is suggested by laboured breathing, dysarthria and dysphagia. Paralysis of the extra-ocular muscles may occur. The pupil usually reacts normally to light and on accommodation, but may be somewhat dilated and fixed, particularly if respiratory distress progresses. If recovery occurs it is marked by gradual regression of the signs mentioned above and return of normal reflexes within forty-eight hours. Sensory changes are rare. One patient is reported to have burned himself unwittingly early in the paralytic stages of his illness. The special senses are not involved, although occasionally vertigo is mentioned. With cranial nerve involment diplopia is common.

As already mentioned, the vectors of human tick-paralysis in North America are *Dermacentor andersoni* Stiles and *D. variabilis* Say, two closely related species. It might, therefore, be suspected that the secretion of the salivary glands will be similar and likewise the clinical picture. This is true in general, but small differences are nevertheless to be found in the clinical features caused by the bite of these two species.

The Australian paralysis-tick, *Ixodes holocyclus* Neum., belongs to quite a different genus, and the disease in man shows some important clinical differences from that seen in America. Stanbury and Huyck (1945) report that in Australia the patients appear more acutely ill, that the disease progresses after the removal of the tick and reaches its height 48 hours later (whereas in America recovery commences almost immediately) and that bizarre signs and symptoms are more common, and total recovery might require weeks.

Only two human cases have so far been reported from Africa (Somaliland) and they were caused by *Rhipicephalus sinus* Koch. This tick is common on cattle and other large domesticated and wild animals in which it does not cause paralysis. Man is an occasional and rare host. Veneroni's paper describing these two cases is not obtainable in this country, but Stanbury and Huyck (1945) give the following summary:

> The first was a boy of four who suddenly developed marked weakness of his legs an indefinite time after the attachment of a tick. When examined there was absence of all voluntary movement of the lower legs. Cutaneous reflexes were weak; tendon reflexes were absent. The child was sent home, but two weeks later was perfectly well.
>
> The second case was a female of six who showed tonic and

clonic convulsions of the neck and face muscles, tachycardia, and tachypnoea. The patient's mother had previously removed a tick from the child's neck. The patient was quite ill but slowly improved and was asymptomatic within a fortnight.

The authors who quote them do not find either of these cases convincing, but they agree that 'it is possible that they represented forms of tick-paralysis'.

It is of interest to report a third case of suspected tick-paralysis due to the same species of tick.

An adult Bantu male from the Krugersdorp district, Transvaal, was admitted to the hospital on 23 February 1950. He was unable to give a history. His relatives stated that he had become ill with headache three weeks before. He gradually became weaker until he could not walk or even feed himself. His speech began to fail until it became incoherent. For the past week he was in bed.

On examination the patient showed marked loss of weight. He was stuporose but could be roused. He heard what was said and appeared to understand, but did not reply. He attempted to obey orders. The other noticeable feature was the marked generalized weakness. All movements were present. All reflexes were also present and equal. Only the abdominal reflexes were absent. There was a plantar-flexor response. The pupils were normal in size, regular and equal, but did not respond to light. The patient responded to painful stimuli over the whole body. A tick was found attached to the lower abdomen. The tick was identified as *Rhipicephalus simus* Koch.

The patient's temperature during the seven weeks in hospital was always between 97° and 98° F. His pulse rate varied between 60-68 per minute. There was no sphincter disturbance. He passed urine every few hours, and he had a bowel action each day. Later, when he became more conscious, he could ask for objects. He had to be fed but he ate well.

There was no change in the patient's condition during the twenty-four hours following the removal of the tick. A lumbar puncture was done. He became very drowsy and slept the whole day; it was difficult to rouse him for meals. He took very little food that day. He gradually improved over the period of several days. He began to feed himself. He sat up in bed. He even conversed. He was not orientated as to place or time. Later he began to walk with help. The main feature was still the marked weakness. A second lumbar puncture was done on 10 March 1950. The patient again became drowsy and slept the following day and then improved again.

Lumbar Puncture (24 February 1950). The pressure was 300 mm. of spinal fluid. There was 1 lymphocyte per c.mm., the total protein was 20 mg. per 100 c.c., the chlorides, 715 mg. per 100 c.c. (as NaCl) and the sugar: 47 mg. per 100 c.c.

Blood Count (24 February 1950). The Haemoglobin was 16.3 grams %; the leucocytes were 7,700 per c.mm. and of them 55% were neutrophils, 8% monocytes, 31% lymphocytes, 5% eosinophils and 1% basophils. The red cells were normal in appearance.

Lumbar Puncture (10 March 1950). The spinal fluid pressure was 300 mm. The cell count was 1 lymphocyte per c.mm. and occasional erythrocytes were present (approximately 77 per c.mm.). Globulin was not excessive, the chloride was 720 mg. % (as NaCl) and the sugar 55 mg. %.

Ophthalmological report (16 March 1950). There was a haziness of the disc edge. The veins were widened, and haemorrhages were present in the tissue of the disc and along the veins. The vessels were bent on leaving the disc. The swelling of the disc was below two diopters.

A later report (27 March 1950) stated that the disc edges were still hazy. There was no swelling on left, doubtful swelling under one diopter was present on right. Physiological cups were filled suggesting previous papilloedema. The old haemorrhages were absorbing. The papilloedema has thus subsided.

X-ray of the chest and skull showed no abnormality. The patient gradually improved on his own and was discharged on 14 April 1950. He could walk by himself. His speech improved.

The clinical picture is somewhat different from that of the Australian cases as well as the American ones. Striking, on the one hand, is the chronic progress of the disease, on the other, the slow recovery as in the cases reported by Veneroni. But different clinical features are to be suspected, the tick vector belonging to a genus which is neither more closely related to *Dermacentor* than to Ixodes.

We, therefore, believe that the two cases recorded by Veneroni as well as the one from South Africa noted above are most probably cases of tick-paralysis caused by *Rhipicephalus simus* which is an uncommon and occasional parasite of man.

We wish to thank Dr. Sunn, Dr. Taussig, and Dr. Trope for their assistance, and the Medical Superintendent of Krugersdorp Hospital for his permission to print the case report.

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CARCINOMA OF THE OESOPHAGUS

ITS SUCCESSFUL SURGICAL REMOVAL

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In a pioneer article, for South Africa, published in this *Journal* on 23 April 1949, Mr. A. Lee McGregor led the way towards the 'conquest of the oesophagus', and under his guidance, it is my privilege to present a case, in which a carcinoma of the oesophagus has been dealt with successfully by surgery.

This heretofore incurable disease, with all its attendant misery in the stages preceding death, has now come within the scope of the surgeon's knife, due in large measure to the outstanding work and publications of R. H. Sweet, and it was this lead that has given us the knowledge to deal with cases such as the one described.

The patient, aged 70, an ex-brick-layer, was admitted to the Johannesburg General Hospital on 5 June 1950. He complained that for the last three months he had had a feeling as if there was a lump at the lower end of his sternum. During this period he had lost approximately 30 lb. in weight and for the past month he had experienced difficulty in swallowing and retaining solid foods. His vomiting occurred two or three seconds after ingestion of any solid food, and this had become so bad that he could take in fluids only. His appetite previously had always been good. He had never suffered from indigestion and apart from malaria six years ago had

not experienced any illness throughout his life of 70 years. There was nothing of note in his family history and he has consumed approximately a quarter of a pound of tobacco a week for the last fifty years.

Examination at that date revealed an elderly man in apparent good health. There was nothing of note in the general examination, except that his peripheral arteries were somewhat thickened and tortuous and his abdominal wall showed evidence of a gross loss of weight. His blood pressure was 120/70 mm. Hg. He was kept under observation until 13 June 1950. It was found that he could take fluids only; his blood count showed 12.5 gm. of haemaglobin, erythrocytes 3,940,000 per c.mm. and leucocytes 6,900 per c.mm. Further investigations revealed a blood urea of 28 mg. per 100 c.c., the prothrombin index was 84%; the blood proteins were 4.1 gm. of albumin and 2.3 gm. of globulin per 100 c.c. The modified Ide reaction was negative and an electrocardiograph was within normal limits for his age.

A barium meal was reported on by Dr. Gunn as follows:

The barium outlined the upper end of a carcinomatous growth at the lower end of the oesophagus. On the films the soft tissue swelling was seen at the area of the oesophageal wall extending down to and involving the hiatus area of the diaphragm and probably the cardiac orifice of the oesophagus into the stomach. The cardiac end of the stomach was loculated and although several attempts were made to outline the cardia after a swallow of barium it was not successful owing to the distortion in the anatomy. A lower oesophageal carcinoma extending down to and involving the cardiac orifice.

On 13 June 1950 he was given 500 c.c. of blood, and again on 14 June 1950.

On 15 June 1950 under general anaesthesia administered by Dr. Devitt and consisting of pentothal, gas oxygen, tuberine, cyclopropane and 0.2% procaine administered intravenously, this patient was operated on. He was placed on to his right side and an incision made from the umbilicus to the ninth costal cartilage on the left side. The abdomen was opened and exploration done with the hand when a carcinoma was found involving the lower inch and a half of the oesophagus and extending for one inch onto the cardiac end of the stomach. Further exploration revealed that there was no evidence of any secondary deposits in the liver or glands. The incision was then extended all the way round the ninth rib and this rib was removed, exposing the thoracic cavity. On the left side, the diaphragm was cut through, down to the oesophagus, and the thoraco-abdominal opening now gave an adequate exposure. The spleen was removed from its attachments with the exception of the pedicle. The whole of the greater omentum was dissected off the transverse colon and the duodenum was cut through distal to the pylorus. The stump of duodenum was closed with three layers of waxed silk sutures. The lesser omentum was cut through and the left gastric artery, as well as the splenic artery, ligated and divided at their origin. The tail of the pancreas was exposed and appeared normal.

The whole mass of spleen, omentum and stomach was turned up and the carcinoma was seen to be free and not invading surrounding structures. The lower four inches of the oesophagus were cleared and an opening was made in the transverse meso-colon and a coil of jejunum brought through, the apex of the loop being approximately eight inches from the duodeno-jejunal flexure. This was sutured to the healthy portion of the oesophagus, three inches above the carcinoma, and then the oesophagus was cut through. The anastomosis was completed with three rows of waxed silk material. This anastomosis was folded in and covered by the jejunum and a jejuno-jejunostomy was performed between the arms of the loop above the meso-colon. The opening in the meso-colon was then sutured to the loops of jejunum, the diaphragm repaired and the abdomino-thoracic wound closed in layers with an intra-pleural under-water drain.

Throughout the operation, which lasted 3¾ hours, the patient received 500 c.c. of blood and a 1,000 c.c. of intravenous 5% glucose water.

On return to the ward his blood pressure dropped four hours later to 80/50 mm. Hg from a normal of 120/70 mm. Hg, and he was given a further 500 c.c. of blood. His progress thereafter was uneventful and on 18 June 1950 he was allowed small feeds of sterile water by mouth having been fed entirely by the intravenous route prior to this. His progress thereafter was satisfactory until 26 June 1950 when his sutures were removed. On the morning of 28 June 1950 he burst the abdominal portion of his wound and extruded a few feet of small bowel. He was taken back to the theatre and this was repaired with through and through sutures, and he was given a further 1,000 c.c. of blood. Thereafter progress was normal and his sutures were removed on 7 July 1950 and on 17 July he was discharged from Hospital on a modified Sippy diet. Since then he has maintained excellent progress and is now on a full diet in small quantities taken at frequent intervals. He has put on 10 lb. in weight and is entirely symptom free.

The histological report on the tissue removed was as follows:—

Sections of this specimen taken from the lower end of the oesophagus show the presence of an anaplastic squamous carcinoma which is invading the muscle layer.

It is still too early to assess whether a cure has been obtained in this case, but one feels that the successful outcome of this operation and the comfort experienced by the patient after it justifies the procedure, even were this carcinoma inoperable. The extensive removal of stomach, spleen, etc., was performed because of the operability of this carcinoma and the hope that a permanent cure may result, and to procure it as wide a removal of the lymphatic area as possible was done. In the event of this carcinoma being found to be inoperable, modification of the operation, as described by Mr. McGregor in his article, would have been instituted.

We recommend this procedure to South African surgeons as being a marked advance on the former inadequate treatment of carcinoma of the oesophagus by gastrostomy, etc.

SUMMARY

A case of carcinoma of the oesophagus, with radical cure by surgery, is described.

I am indebted to Mr. A. Lee McGregor for his permission to operate on this patient from his wards.

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THE PRODUCTION OF PROTECTIVE ANTIBODY

IN HUMAN BEINGS IMMUNIZED WITH TYPHOID ENDOTOXOID

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The antigenicity of a typhoid vaccine as determined by laboratory tests may or may not be a true reflection of its ability to immunize man against the disease, typhoid fever. Grasset, in numerous publications (e.g. 1933, 1938) and Grasset and Lewin (1936, 1937) have shown that typhoid endotoxoid stimulates the production of agglutinins and protective antibody and, from the practical aspect, Grasset (1945) has shown that it immunizes man solidly against the disease.

Although mice can readily be killed by an intraperitoneal inoculation of typhoid bacilli and although they may be so immunized that they withstand such an inoculation, they do not suffer from the disease as it occurs in man. Such a test of immunity is not necessarily of the same nature as one carried out in guinea-pigs immunized with a plague antigen and challenged with *Pasteurella pestis*, a microbe that produces plague in rodents as well as in man. Probably a typhoid antigen that stimulates agglutinin and protective antibody formation in rabbits, and that immunizes mice against the intraperitoneal injection of living microbes, would immunize man more solidly against typhoid fever than one that is feebly antigenic in small animals. This contention is supported by the observation of Boyd (1943), who recorded that an Italian vaccine, feebly antigenic in mice, did not immunize man so well against typhoid fever as did a British Army vaccine, highly antigenic in mice.

During a recent visit to Great Britain one of us (J. H. M.) discussed this problem with several authorities. The consensus of opinion was that there is probably a correlation between antigenicity in the mouse and in man, but no one was willing to commit himself definitely. Until a properly controlled experiment has proved or disproved the hypothesis such a guarded opinion is fully justified.

We have been able to show, in common with many other workers, that typhoid antigens of widely differing antigenicity for the mouse can be prepared and we have adopted the not unreasonable procedure of issuing only endotoxoids that come up to a provisional laboratory standard. However, as little has been published on the protective antibody stimulating power of endotoxoid in man, we have summarized the results obtained with a number of Native mine workers and with a few laboratory workers.

PRESENT INVESTIGATION

The Native mine workers who were selected had no record of previous immunization. They were bled, received two subcutaneous injections (0.5 ml. and 1.0 ml.) of endotoxoid with a 14 days' interval between injections and were again bled 14 days after the second dose. The unpreserved sera were held at 2° C. pending test and the pre- and post-immunization samples from each individual were titrated at the same time.

Agglutination Tests. These were carried out in the usual way, using antigens prepared in the Diagnostic Department of the Institute.

Protection Tests. As challenge organism, *Salmonella typhi* strain Ty2, was used throughout and was at all times maintained in a highly virulent state. Into each mouse of a group, the serum under test was injected intraperitoneally and, four to five hours later, the challenge dose of living microbes was inoculated, also intraperitoneally. The experiment was terminated on the third day. Each serum was titrated by injecting the test dose of living organisms suspended in 0.5 ml. of sterile 5% hog gastric mucin, and in addition a few sera were assayed using saline suspensions of the microbes. Control unprotected mice were included in the titrations of each serum or group of sera, and because the results recorded in Tables 2, 3 and 4 were all satisfactorily controlled, the records of the control experiments have been omitted.

Viable Count. A measured amount of a dilution of bacterial suspension, calibrated for opacity in a photo-electric colorimeter, was deposited on nutrient agar with a Trevan (1922) micro-syringe. In all, 19 counts, involving the enumeration of the colonies developing in 119 drops, were made. The arithmetic mean of the number of colonies growing in each drop was 50.3, the standard deviation was 10.8 and the standard error of the 19 means was 1.0. Thus, the method gave reasonably consistent results.

In all, 272 mice were used as controls for the mucin technique and 80 for the saline technique. The LD_{50} of the challenge culture, as determined by the method of Reed and Muench (1938) was in mucin, 530 microbes, and in saline, 21 million microbes. The number of organisms injected in mucin was, except for serum I, kept constant at 125,000; in saline the number varied from 25 to 625 million.

RESULTS

Table 1 records the results of titrating the pre- and the post-immunization serum samples from Native 1. In Table 2, the titration results of 25 sera using bacilli suspended in mucin are given, and in Table 3 those of 8 of the same sera, using saline-suspended organisms,

are recorded. In these tables the Vi agglutination titres are omitted because no serum caused agglutination at a dilution of 1:10.

TABLE 1: RISE IN PROTECTIVE ANTIBODY CONTENT OF SERUM I.

Type of Test	*No. Ty2*	*Serum Pre-Immunization*	*Serum Post-Immunization*	*None (Controls)*
	(Thousands)			
	0·2			1/4
	1·0			3/4
Ty2 in Mucin	5·0	6/8		11/12
	25·0	7/8		12/12
Serum, 0·1 ml.	125		0/4	
	250		4/8	
	625		2/8	
	1,250		2/8	
	LD_{50}	<5,000	>1,250,000	725
	(Millions)			
	12·5			2/4
	25·0	3/4		6/8
Ty2 in saline	62·5	7/8		12/12
Serum, 0·5 ml.	125	4/4	1/5	4/4
	250		3/7	
	625		8/8	
	LD_{50}	<25 m.	250 m.	16·9 m.
Agglutination	H	o	640	
	O	tr 10	320	

(Denominator = No. of mice challenged; Numerator = No. of mice that died; Agglutination: the figures are reciprocals of serum dilutions causing agglutination; o = no agglutination at a serum dilution of 1:10; tr = trace; m. = million)

The protective power and agglutination titres of the sera of 10 laboratory workers are recorded in Table 4. Nine had received a full course of three injections of either endotoxoid or T.A.B. vaccine originally, and subsequently a yearly booster dose of 0.5 ml. of endotoxoid, the last dose having been given nine months prior to taking the serum samples. One individual (M. E.) was unimmunized.

In Table 5, the O agglutination titres and the protection titres (the amount of serum in ml. protecting mice against 125,000 bacilli in mucin) of a number of samples are compared.

DISCUSSION

An analysis of the results given in Table 1 shows that the LD_{50} of the mucin-suspended bacilli was: for the control mice 725, for the pre-immunization serum mice < 5,000 and for the post-immunization serum mice > 1,250,000; for the saline-suspended bacilli the figures were: for the control mice 16.9 million, for the pre-immunization serum mice < 25 million, and for the post-immunization serum mice 250 million. Thus it is obvious that immunization stimulated protective antibody formation.

The records in Tables 1, 2 and 3 show that there was a definite rise in protective antibody titre in 17 of 26 sera; in five sera (3, 4, 11, 14, 16) there was a doubtful rise; and in four sera (10, 18, 22, 25) there was no rise. However, it should be noted that the pre-immunization samples of 'doubtful' sera 3, 4, and 11, and of the 'no change' sera 10, 18, and 25 all contained protective antibody, one of them (10) protecting in as small a dose as 0.01 ml. Thus, the only real failure was serum 22, both samples of which failed to protect mice at a

TABLE 2: PROTECTIVE ANTIBODY PRODUCTION: CHALLENGE DOSE OF TY2 (125,000 BACILLI) IN MUCIN

No.		*Serum Agglutination Pre-Immunization*	*Serum Agglutination Post-Immunization*	*Dose (ml.)*	*Serum Protection Pre-Immunization*	*Serum Protection Post-Immunization*	*Change in Protective AB. Titre*
2*	H	o	160	0·5	2/4	0/4	?+
	O	20	80				
3*†	H	320	2,560	0·1	4/6	3/6	?+
	O	10	40	0·2	1/6	1/6	
				0·5	0/3	0/4	
4†	H	o	160	0·02	10/12	5/12	?+
	O	o	80	0·05	1/6	1/6	
5	H	o	160	0·1	6/6	2/6	+
	O	o	160	0·2	10/12	2/12	
6	H	160	320	0·1	6/6	0/6	+
	O	o	80				
7	H	o	640	0·1	6/6	0/6	+
	O	o	40				
8	H	o	640	0·1	5/6	1/6	+
	O	o	80				
9	H	o	320	0·1	6/6	1/6	+
	O	40	160	0·5	2/6	0/6	

TABLE 2 (*continued*)

No.		Serum Agglutination Pre-Immunization	Serum Agglutination Post-Immunization	Dose (ml.)	Protection Pre-Immunization	Protection Post-Immunization	Change in Protective AB. Titre
10†	H	o	320	0·003	5/6	6/6	o
	O	20	160	0·01	0/6	0/6	
				0·03	0/6	0/6	
				0·1	0/6	0/6	
11†	H	o	320	0·1	9/12	5/12	?+
	O	o	160	0·25	2/6	0/6	
12	H	o	320	0·1	5/6	3/6	+
	O	o	80	0·25	5/6	0/6	
13	H	10	160	0·25	5/6	0/6	+
	O	40	80				
14	H	o	1,280	0·1	5/6	6/6	?+
	O	o	20	0·5	17/18	14/18	
15†	H	o	320	0·075	6/6		+
	O	o	20	0·05	6/6	1/6	
				0·1	1/6	0/6	
				0·25	0/6	0/6	
16	H	o	1,280	0·25	6/6	3/6	?+
	O	o	40	0·5	6/6	4/6	
17	H	o	1,280	0·2	6/6	1/6	+
	O	o	20				
18†	H	o	160	0·025	3/6	3/6	o
	O	20	20	0·1	0/6	0/6	
				0·25	1/6	1/6	
19	H	o	5,120	0·1	5/6	0/6	+
	O	o	160				
20	H	o	10,240	0·1	6/6	4/6	+
	O	o	20	0·25	5/6	2/6	
				0·5	6/6	2/6	
				0·75	3/6	0/6	
21	H	o	1,280	0·1	5/6	2/6	+
	O	10	80	0·2	6/6	0/6	
22	H	o	1,280	0·1	6/6	6/6	o
	O	10	40	0·25	6/6	5/6	
				0·5	5/6	5/6	
				0·75	2/6	3/6	
23	H	o	2,560	0·1	5/6	2/6	+
	O	o	160	0·2	5/6	0/6	
24	H	o	640	0·5	6/6	1/6	+
	O	o	80				
25†	H	o	2,560	0·01	6/6	6/6	o
	O	o	640	0·03	0/6	1/6	
				0·1	1/6	0/6	
				0·5	0/6	1/6	
26	H	o	1,280	0·1	5/6	1/6	+
	O	o	40				

(AB. = antibody; Agglutination—40, 80, etc. = reciprocals of serum dilutions causing agglutination; o (column 3) = negative at serum dilution of 1:10; + = rise in antibody; o (column 8) = no change in antibody; denominator = number of mice challenged; numerator = number of mice that died; * = see saline tests; † = protective AB. in pre-immunization serum sample).

TABLE 3: PROTECTIVE ANTIBODY PRODUCTION: CHALLENGE DOSE OF TY2 IN SALINE.

Serum	No. Ty2 (millions)	Serum Dose (ml.)	Protection Pre-Immunization	Protection Post-Immunization	Change in Protective AB. Titre
2	62·5	0·5	4/4		
	125	0·5		0/4	+
3	62·5	0·5	2/4		
	125	0·5	4/4	4/8	?+
	62·5	0·1	1/4		?
4	125	0·1		0/4	See tests
	62·5	0·5	0/4		with
	125	0·5	1/4	1/8	mucin
	62·5	0·5	1/4		
5	125	0·5	4/4	0/4	+
	250	0·5		2/3	
6	62·5	0·25	3/4		
	125	0·25		1/4	+
7	62·5	0·5	3/4		
	125	0·5		1/4	+
8	62·5	0·5	3/4		
	125	0·5		2/4	+
9	62·5	0·5	2/6		
	125	0·5		0/6	+

(AB.= antibody; + = rise in protective antibody; denominator= number of mice challenged; numerator=number of mice that died).

TABLE 4: IMMUNIZED EUROPEANS. SERUM PROTECTION, USING 125,000 TY2 BACILLI IN MUCIN AS A CHALLENGE

Serum	No. Courses	Titre	Agglutination H	Agglutination O	Agglutination Vi
C.G.	2*	0·1—0·2	tr20	o	o
N.I.	10	0·1†	40	o	o
J.C.	2*	0·1†	o	o	o
M.O.	3	0·2	20	o	o
S.M.	7	0·2	40	o	o
R.O.	12	0·1†	160	o	o
W.I.	4	0·3	tr20	o	o
B.O.	6	0·1	tr20	o	o
B.R.	6	0·1	o	o	o
M.E.	0	>0·5	—	—	—

(*=Original immunization with T.A.B.; †=0·1 ml. serum smallest amount used; Titre=ml. serum protecting mice against 125,000 bacilli; agglutination: o=negative at serum dilution of 1:20; 20, 40 etc.=reciprocals of serum dilutions causing agglutination; tr=trace; —=not tested).

dose of 0.5 ml. and protected only doubtfully at 0.75 ml.

The results in Table 4 show that individuals who had undergone yearly immunization for from 2 to 12 years had protective antibody in their sera some nine months after the last booster dose.

From the results in Tables 1 and 2 it can be seen that immunization nearly always results in the appearance or increase of O agglutinins but the results in Tables 4 and 5 show that there is no correlation

TABLE 5: COMPARISON OF 'O' AGGLUTINATION TITRE AND DOSE OF SERUM PROTECTING MICE AGAINST 125,000 BACILLI IN MUCIN

Serum	'O' Titre	P.T.
15 Pre-	o	0·1
14 Pre-	o	>0·5
7 Post-	40	0·1 or less
22 Post-	40	0·5—0·75
15 Post-	20	0·05
20 Post-	20	0·25—0·75
10 Pre-	20	0·01
10 Post-	160	0·01
25 Pre-	o	0·03
25 Post-	640	0·03

(Pre- and Post- = Pre- and post-immunization serum samples; o under 'O' titre=no agglutination at serum dilution of 1:10; figures under 'O' titre=reciprocals of serum dilutions causing agglutination; P.T.=protective titre, i.e. ml. serum protecting mice against 125,000 bacilli in mucin).

between the protective and the agglutination titres. No serum at a dilution of 1:10 agglutinated a Vi suspension so that a comparison cannot be made. It is well known that the agglutination titre falls more quickly and completely than the protective titre. If the Vi and/or O serum titres are to be taken as criteria of the immune state of the individual, the nine immunized individuals noted in Table 4 would be declared non-immune; yet all had demonstrable protective antibody, three (N. I., J. C., and R. O.) in considerable amount.

The results recorded show conclusively that two injections of typhoid endotoxoid may be relied upon to stimulate protective antibody formation in the majority of individuals so immunized. They do not, however, throw a clear light on the true value of the protection test, e.g. is an individual with a serum protective titre of 'x' more immune than one with a titre of 'x/10'? However, in view of Grasset's extensive work on the immunizing power of endotoxoid against typhoid fever in man, and in view of the work recorded in this paper, it can be assumed, as a working hypothesis, that the protective titre of a serum is a better indication of the immune state of the individual than is the agglutinating power.

No reference has been made to protection tests carried out by other workers. The immunizing and challenge strains, the number, size, and spacing of the doses of vaccine, the susceptibility of the strain of mouse used, and the method of conducting the viable count all introduce variables that do not allow of a true comparison.

CONCLUSION

1. Two doses, 0.5 ml. followed by 1.0 ml., of typhoid endotoxoid either stimulated the formation of, or increased the amount of, circulating protective antibody in the majority of 26 Native mine workers, so immunized.

2. Protective antibody was present in the sera of nine immunized laboratory workers, nine months after the last booster dose of endotoxoid.

3. This protective antibody was present, in spite of the absence of demonstrable Vi agglutinin.

4. There was no correlation between the O agglutinin and the protective antibody titres.

Our thanks are due to Dr. J. H. G. van Blommestein, Chief Medical Officer of the Anglo-American Corporation, for organizing the immunization and the bleeding of the native mine workers, and to Miss Sheila Carson, B.Sc., of the Serum Department of the Institute, for carrying out the bacterial counts.

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NEW PREPARATIONS AND APPLIANCES

Absorbable Haemostatics in Surgery (Gelatin Sponge A & H)

The problem of inaccessible, uncontrollable haemorrhage, is one with which every surgeon is familiar. There are many sites at which the control of bleeding by ligation is virtually impossible without causing undue trauma. These include the brain, the liver, veins, arteries, and the heart. Local pressure, cautery, and gauze packs may prove efficacious, but frequently, e.g. in head injuries, the gauze may have to be left *in situ* with consequent risk of infection and a possibility of recurrence of the haemorrhage when the pack is removed. In such circumstances the availability of an absorbable haemostatic would be an advantage.

Gelatin sponge, a preparation of gelatin whipped into a foam and dried, has been used clinically in the U.S.A., Great Britain, and Scandinavia. It is simple to use, non-antigenic, non-irritant and compatible with both penicillin and streptomycin. It has been used in a wide range of operative procedures including prostatectomy,[1, 2] neurosurgery,[3] and cardio-vascular surgery. Hutchinson[4] has stated that 'postage-stamps' of gelatin sponge are ideal for maintaining a clear field in fenestration operations, where control of oozing is always a difficult problem. Gelatin sponge has also been used after dental extractions,[5] and in more extensive odontological work.[6]

Gelatin sponge is sufficiently soft and pliable to be cut with scissors, and moulded to suit the need of the occasion. It may be used either in the dry state or moistened with normal saline. Thrombin may be used instead of the latter if a blood dyscrasia necessitates this.

Certain general considerations should be borne in mind when using these new haemostatic substances. They are not to be regarded as substitutes for ligature, but are intended solely to assist in the control of haemorrhage when a ligature is not feasible. Absorbable haemostatics augment the normal physiological clotting mechanisms of the blood, hasten clot formation, and give mechanical support to the clot. The close network of interstices in gelatin sponge facilitates this latter process.

Blood should be allowed to soak into the sponge from the bleeding area, and then firm even pressure should be exerted for three to four minutes, or longer, as required by the magnitude and location of the haemorrhage. Before applying the sponge care should be taken to see that clot formation has not already taken place, and should a haematoma form beneath the material the sponge may need to be removed and a fresh one applied firmly and evenly.

As these absorbable haemostatic materials come to be used more extensively so will their applications be extended. Gladstone[7] and other workers have developed the use of gelatin sponge for cancer biopsy of the cervix, and a number of investigators[8, 9] have examined the possibility of using absorbable materials in orthopaedic surgery, including tendon repair.

Further modifications may become available, and already there have been reports about the use of gelatin film in neuro- and thoracic surgery,[10] and of experiments on dogs using gelatin sponge powder and thrombin for the arrest of gastric haemorrhage.[11]

Further information may be obtained from Allen & Hanburys (Africa) Ltd., P.O. Box 860, Durban.

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ASSOCIATION NEWS : VERENIGINGSNUUS

R.M.O. Group

MINUTES OF THE ANNUAL GENERAL MEETING HELD AT JOHANNESBURG ON 20 OCTOBER 1950

Present. Thirty-two members with Dr. Radloff in the Chair.

1. *Minutes of the last Annual General Meeting* (circularized) were taken as read.

2. *Matters arising out of the Minutes and Confirmation of Minutes.* Dr. van Niekerk wished to know how the Census was taken, and said he would like a new method adopted. The Chairman and Secretary explained the method, and stated that the Group had agreed to this annual instead of the triennial method, three years ago. The Chairman stated that Dr. van Niekerk was the only member who had complained. Dr. van Niekerk wished a new system formulated. The Chairman suggested the matter be brought up later.

Centralization and Decentralization. The Chairman stated that a Sub-Committee had been appointed by the Sick Fund, its completed report was still *sub judice*. It recommended we return to the principle of centralization, but with some relaxation to allow for some work to be done outside large centres. Dr. Besselaar recommended that this report be submitted to the Group. Dr. Vercueil said R.M.O.s were compelled to do surgery for which they were not paid, neither were they paid for urgent operations on visitors, whereas Railway Specialists were paid for operations on visitors. R.M.O.s were constantly called to attend visitors from other Provinces. Dr. Coetzee contended that Surgical Specialists in Johannesburg could not cope with the number of operations that had to be performed here and also expressed dissatisfaction that Specialists were paid for visitors whereas R.M.O.s were not paid.

The minutes were then confirmed and signed.

3. *The Annual Report of the Hon. Secretary-Treasurer for the Thirteen Months ending October 1950:—Mr. Chairman and Gentlemen*: At the last Annual General Meeting at Cape Town in September 1949, the following resolutions were passed unanimously by the R.M.O. Group:—

1. That Federal Council be requested to negotiate on behalf of the R.M.O. Group, with the S.A.R. Central Sick Fund Board and the Railway Administration, with the object of increasing the capitation fees and other emoluments of the R.M.O.s (General Practitioners and Specialists) to conform with those which have been agreed upon by the Medical Association in respect of other Sick Benefit Societies.

2. That Federal Council negotiate with the Central Sick Fund

Board and the Railway Administration with the object of paying the R.M.O. at Table Bay Harbour the existing capitation rate of 6s. p.a. in respect of the Native employees resident in the Docks location, retrospective, instead of the £50 p.a.

3. That Surgery allowances, i.e. the payment to an R.M.O. for attendance at workshops, etc., for the benefit of members of the Fund and other employees who are not on the R.M.O.'s panel shall be at adequate rates. We shall be glad if Federal Council will give its special attention to the following items wherein the R.M,O. Group has failed, in a large measure, to get satisfaction. Because of the complexity of the problem involved, the Group offers Federal Council its assistance and will be prepared at any time to co-operate with Federal Council and give personal evidence.

i. Increased remuneration for specialist and R.M.O.s with a capitation increase to 18s. for Europeans and 12s. p.a. for non-Europeans for R.M.O.s and for Specialists according to fees laid down by Federal Council.

ii. Midwifery fee increased to £5 5s.

iii. Anaesthetic and Assistance fee increased to £2 2s.

iv. To review the ruling that R.M.O.s claim from Insurance Companies for attendance and anaesthetics under the Motor Vehicle Insurance Act.

v. That R.M.O.s and Specialists be paid fees at W.C.A. rates for W.C.A. cases.

We request that, as these are urgent matters, Federal Council or the Executive Committee deal with them immediately.

It was further resolved unanimously that your Executive Committee present the following requests to the Central Sick Fund Board.

1. To rescind the resolution passed by the Cape Midland Board *re* a compulsory six months' partnership for future Assistant R.M.O.s in that System.

2. That a special fee per call be paid for night calls (between 7 p.m. and 7 a.m.) for reconsideration.

3. That the fees for (a) Entrance Examination; (b) Examination for appointment to permanent staff; (c) Such re-examination be raised to 10s. 6d. each.

4. That non-operative cases, hospitalized from outside areas, treated by an R.M.O. in that hospital area, be paid for at one guinea per patient per month.

5. That motor travelling allowance in country districts be increased.

6. A request for Free Passes for R.M.O.s with 15 years' service, who retire at 55 years of age—also for their wives.

7. That no complaints from members against R.M.O.s be considered by Sick Fund Boards unless handed in within seven days, except in special circumstances of long and serious illness of member. (*Vide Sick Fund Regulation.*)

8. That the retiring age of R.M.O.s who are fit, be extended to 65 years.

9. That R.M.O.s be paid a Consulting Room allowance.

10. That R.M.O.s working on Hospital Staffs and Nursing Homes be paid some fee for lumbar puncture. Also for Blood Transfusion, where this is not paid by a Transfusion Service.

It was unanimously decided not to accede to the Ministerial request that casual employees be charged say 2s. 6d. for examination plus a Medical Certificate.

On 14 October 1949, Federal Council Sub-Committee notified your Secretary that they had requested an interview with the Railway Administration and also with the Central Sick Fund Board On the same date, the requests handed to your Executive Committee (other than those handed to Federal Council) were sent to the Central Sick Fund Board. On 30 November 1949 the Central Sick Fund Board replied that it wished to meet your Executive Committee to have the matter clarified and the future policy for negotiation decided. A meeting of your Executive Committee with the Central Sick Fund Board, lasting almost the whole day, was eventually arranged and held on 21 August 1950. Your Executive Committee held a preliminary meeting the previous day. The main reason for the Central Sick Fund Board's request to meet your Executive Committee was apparently to decide the future policy for negotiation. We were asked to decide whether we wished Federal Council to negotiate on our behalf, or whether we wished to negotiate ourselves. Your Executive Committee decided that it wished Federal Council to negotiate on the matters handed over to them by the R.M.O. Group at Cape Town last year, and that your Executive Committee wished to negotiate on the remaining minor matters, as instructed by the Group. It was pointed out to the Central Board that the R.M.O. Executive Committee had negotiated for very many years to obtain better remuneration but with little success. For that reason, the Group handed matters over to Federal Council. Central Board apparently was not very anxious to negotiate with Federal Council.

Roneoed Minutes of the last Annual General Meeting were sent to all R.M.O. Group members.

Membership. Remains approximately the same as last year.

Representations were made to the Sick Fund on behalf of several members, who had reached the retiring age. Their services were extended in an acting capacity.

Financial Statement. Certified, audited copies will be distributed for examination. The main item of expenditure this year was for your Executive Committee joint meeting with the Central Sick Fund Board last August. The Group's financial position remains sound.

In conclusion, on behalf of the Group, I wish to thank the Chairman and Group Representatives for the time spent and the work done for the Group during the past year.

Last, but not least, a hearty vote of thanks to Dr. C. H. H. Coetzee for his good services as Acting Honorary Secretary for four months, during the Secretary's absence.

This, Gentlemen, concludes the Annual Report.

After the conclusion of the report Dr. Cairncross stated that there had been no Branch Group elections at Bloemfontein or Kimberley for the past few years, and suggested that something be done to remedy this irregular state of affairs.

The Chairman, Dr. Radloff, said there were no matters arising out of the Report that needed discussion and, although it appeared easy and simple, he wished to assure the Group that such a report entailed a lot of work. He expressed his hearty thanks to the Secretary for the trojan work he had done for the Group. He also wished to inform the Group that Dr. Coetzee was Acting Secretary during the absence of Dr. Cairncross, and he wished to express to him the Group's hearty thanks.

Dr. Vercueil wished to know why the Central Board was not anxious to negotiate with Federal Council.

Dr. Coetzee wished to know why there was a delay of nine months in connection with the Group's decision of last year.

In reply Dr. Cairncross stated that the Central Board had informed the Group that it first wished to interview the R.M.O. Executive Committee. An attempt was made early in January, but Executive Committee members were away on their annual holiday, and the Secretary received one day's

BRANCH GROUP ELECTION RESULTS FOR 1950

	Representative.	*Secretary*	*Co. Member*
Eastern Transvaal	Dr. C. H. H. Coetzee	Dr. B. Lubbe	Dr. D. J. de Villiers
Western Transvaal	Dr. C. Cairncross	Dr. A. Bernstein	Dr. L. Vercueil
Orange Free State	——	——	——
Natal	Dr. H. Grant-Whyte	Dr. C. Weinberg	——
Cape North	——	——	——
Cape, Eastern	Dr. L. Jaffit	Dr. F. K. Gutsche	Dr. A. Z. Butt
Cape, Midlands	Dr. J. C. Rabie	Dr. D. v. d. Merwe	Dr. T. Wooldridge
Cape, Western	Dr. W. P. Steenkamp	Dr. A. Gordon	Dr. J. R. E. Lee
South West Africa	Dr. F. J. Marais	——	——

notice; for these reasons no meeting was held. Your Secretary then suggested the meeting be held in Cape Town in February. The General Manager of the S.A.R. found this impossible on account of pressure of work during the Parliamentary Session, and agreed to meeting our Executive Committee after the Session. The meeting was then arranged for July, but for unknown reasons was postponed to 21 August.

4. *Appointment of Scrutineers for Ballot.* The Chairman appointed the following scrutineers: Dr. Lubbe, Dr. Bernstein, Dr. Drotske.

Dr. Cairncross then read an apology for unavoidable absence from Dr. Grant-Whyte.

5. *A request from the Central Sick Fund Board for the views and recommendations of the Group re the retention of services of R.M.O.s beyond the present retiring age of 60 years.* After a lengthy discussion, it was resolved *nem. con.* 'That the retiring age of R.M.O.s be 65 years.'

It was also resolved that endeavours should be made to establish a pension scheme.

6. *Proposal that all R.M.O.s be members of the Medical Association and that this be a condition of appointment. Also that R.M.O. Group subscriptions be reduced to one or one and a half guineas.* After full discussion it was decided: 'That all R.M.O.s should be members of the Medical Association.'

It was also decided that from 1951 subscription rates be as follows:—

For R.M.O.s with a basic salary of £500 or more—£2 2s. p.a.
For R.M.O.s with a basic salary of less than £500—£1 1s. p.a.
For Assistant R.M.O.s £1 1s. p.a.—for a trial period of a year.

7. and 8. *These two proposals were taken together for discussion.* A unanimous proposal from four Branch Groups that: The R.M.O. Group reaffirms the resolution taken at the last Annual General Meeting of the R.M.O. Group, to ask Federal Council to negotiate on our behalf, on the matters specified.

A proposal from one Branch Group: That until such time as a deadlock occurs between the R.M.O. Executive Committee and the Administration, the Federal Council be asked to withdraw and leave the R.M.O.s to settle their own affairs.

Dr. Cairncross read the following telegram received from Federal Council:—Federal Council expresses displeasure at confusion which has taken place regarding interview with Central Sick Fund Board stop suggest that Group internal affairs be put in order stop does Group wish Federal Council to continue negotiations on its behalf on points already referred to it—*Medical Secretary, Federal Council.*

A long and heated discussion followed. Dr. Jooste said we all knew that at our last Annual General Meeting the Group decided unanimously that certain matters be handed over to Federal Council and that other matters be dealt with by the R.M.O. Executive Committee. We also know that at our joint meeting with the Central Sick Fund Board certain members of the R.M.O. Executive Committee expressed the opinion that we should take matters out of the hands of Federal Council. Dr. Radloff explained that the R.M.O. Executive Committee met Federal Council Sub-Committee, at the request of the latter, during July 1949. The matters of W.C.A. and remuneration of the R.M.O. at Cape Town docks were handed over to Federal Council. It was also suggested then by the R.M.O. Executive Committee that the Group should request Federal Council to take over all our negotiations. At that meeting he, as Chairman, was very much opposed to handing over all our negotiations to Federal Council, and he stated clearly that the resolution taken then was that Federal Council should negotiate on W.C.A. and R.M.O. Cape Town docks remuneration only and that all other matters should be dealt with by the R.M.O. Executive Committee. At Cape Town Congress it was resolved by the Group to hand over all major matters to Federal Council. He naturally felt sore about this, because he knew what he had done in the past by way of negotiating and the cumbersome way negotiations go. He felt the Executive Committee should be reaping fruits sooner. When the matter was discussed at the Central Board Meeting, the Vice-Chairman represented the R.M.O. Group, and the Chairman of the Central Board said that it was not prepared to negotiate with two bodies, but wished to meet the R.M.O. Executive Committee first. In spite of repeated requests for this meeting to be arranged there was a long delay. Eventually the meeting was held on 21 August 1950, and he supported the proposal that the matter should be referred to Federal Council, but felt that the Sick Fund had every right to conclude that some R.M.O. Executive Committee members were in favour and others not in favour of the Group's Cape Town resolution. Dr. Jooste stated that Federal Council must, as a policy, act on our behalf in the future. Dr. Vercueil said the Central Board appealed to us to approach Dr. Braun to withdraw and delegate power to the R.M.O. Executive Committee to continue negotiations. Dr. Braun was not in a position to do so, and he refused. The R.M.O. Executive Committee held a caucus meeting and decided by a majority vote of 5 to 3 that the Executive Committee reaffirmed the 1949 resolution of the Group that Federal Council should negotiate. He said we felt sore that after a unanimous resolution of the Group at Cape Town, some of our Executive Committee members disassociated themselves from that resolution. Dr. Jooste, in supporting Dr. Vercueil, reiterated the fact that some R.M.O. Executive Committee members had opposed the unanimous decision of the Group. Dr. Lipschitz stated that the Group had a right to ask Federal Council to negotiate on certain matters as it had not been able to get satisfaction.

Dr. Cairncross informed the meeting that its Executive Committee agreed that Federal Council should negotiate on the matters handed over to them by the Group at the Cape Town Congress. Dr. Coetzee said we had asked the Chairman of the Sick Fund to negotiate with Federal Council, but he seemed reluctant to agree to this. Dr. Radloff said that unfortunately last year he very distinctly opposed the proposal of going to Federal Council, but after the matter had been handed over, he supported the Group. Dr. Coetzee had stated at our joint meeting that he (Dr. Radloff) was opposed to the proposal of going to Federal Council and the Group could easily draw the conclusion that he has been sabotaging their efforts, which he denied. Dr. Coetzee informed the Meeting that the Sick Fund Sub-Committee which investigated their finances decided that if they increased member's subscriptions by 5% their deficit would be covered after four years, and only after that would they consider our requests.

Dr. Vercueil compared subscription rates of miners with those of Railway employees and pointed out that, in the lower grades, Railway subscription rates were less than half that of the Mines. It should be brought home to the Sick Fund that they will never balance their budget on their present subscription rates.

The unanimous decision of this Annual General Meeting was: The R.M.O. Group reaffirms the unanimous resolution taken at the last Annual General Meeting of the R.M.O. Group to ask Federal Council to negotiate on our behalf, on the matters specified as, in the opinion of the Group, a deadlock has been reached.

It was also unanimously resolved that the Group withdraws the 10 items handed over at last year's Annual Meeting for negotiation by the R.M.O. Executive Committee.

The result of the ballot was then declared.

The election results were as follows:—

1. *Chairman*: Dr. L. O. Vercueil.
2. *Vice-Chairman*: Dr. C. H. H. Coetzee.
3. *Hon. Secretary-Treasurer*: Dr. C. Cairncross.

The Chair was taken by Dr. Vercueil, who informed the Group that he intended contacting Dr. Braun immediately.

9. *That further attempts be made to have a Pension Scheme for R.M.O.s.* Dr. Cairncross informed the meeting that the Executive Committee had appointed a Sub-Committee consisting of Drs. Rabie, Woolridge and one other to formulate a pension scheme for R.M.O.s. The Sub-Committee would report to the Group. This was accepted by the meeting.

10. *Central Sick Fund Board's request for views and recommendations of the group re supply of proprietory preparations, etc., and maximum quantities to be supplied.* Dr. Cairncross said a Sub-Committee was appointed by the Sick Fund to draw up a memorandum for the supply of drugs, medicines, etc., and quantities allowed. Five copies of this Memorandum were distributed.

Dr. Radloff stated that in the past an R.M.O. was not allowed to prescribe certain drugs, whereas a Specialist was allowed. This clause had been deleted, and an R.M.O. was now allowed to prescribe any drug prescribed by a Specialist. Certain patent medicines had been deleted.

Dr. Fleming-Johnston suggested that Railway dispensaries should supply equivalent drugs for private practitioner prescriptions, the same as is done with R.M.O.'s prescriptions. Dr. van Niekerk endorsed this suggestion. Dr. Jooste

suggested that prescriptions issued by private practitioners should not be dispensed by Railway dispensaries, also that certain items should be deleted from the regulations.

Dr. Coetzee proposed and Dr. Cairncross seconded that the Memorandum be accepted. *Carried.*

11. *Financial Statement.* Certified audited copies of the Financial Statement were distributed earlier on. The Statement was accepted by the meeting and signed by the Chairman.

12. *Any other business.* Dr. Coetzee asked the Secretary to retire. On being recalled he was informed that the Group had voted him an honorarium of seventy-five guineas. He expressed his appreciation and thanked the Group for its kindness.

Dr. Jooste proposed that the Assistant Secretary be voted an honorarium of ten guineas. *Agreed.*

Dr. Vorster objected to the carrying of pill-boxes and proposed that this procedure be abolished.

Drs. Jooste and Van Niekerk discussed the present method of taking the Annual Census, and suggested that a new method be adopted. Dr. Cairncross explained the present system, evolved after six years' discussion. He stated that the Group agreed three years ago, to accept this system formulated by the Sick Fund. The Group reserved the right of review after the 1951 Census. He thought the Group should honour its three-year agreement with the Sick Fund. Dr. van Niekerk objected to attending patients not living in his area. He thought the present system most unsatisfactory, and said the only way to stop this irregularity would be to receive a list of beneficiaries residing in his area. Dr. Jooste objected to attending visitors without remuneration. He proposed that a system similar to the Mines Benefit Society be adopted. This proposal was carried.

Dr. Vorster pointed out that the names of member's children earning more than £10 p.m. still appeared on Sick Fund cards. The Sick Fund's attention should be directed to this.

Dr. Coetzee proposed a vote of thanks to the retiring Chairman Dr. Radloff, who had done his work conscientiously. Dr. Radloff was entitled to his views, and according to these he had done his best for the Group.

There being no further business the meeting closed at 1 p.m.

C. Cairncross,
Hon. Secretary-Treasurer, R.M.O. Group.

20 November 1950.

QUEENSTOWN DIVISION: MINUTES OF A MEETING HELD IN THE GLEN GREY MISSION HOSPITAL, LADY FRERE, ON 10 NOVEMBER 1950

Present: Drs. Botha, Cheyne, Holmes, Sapirstein, Schaffer, Schweitzer, Swemmer, Weideman, who had journeyed over from Queenstown; Dr. Belford from Molteno, Dr. Jardine from Elliot, Dr. Paisley (Jnr.) from Cala; Dr. Maartens, District Surgeon of Lady Frere; and resident at the hospital were Drs. Kunz and Frolich.

The members were welcomed by Dr. Kunz and Father Frey, and then shown through the hospital. We all were greatly surprised and pleased to see how rapidly it has grown since it was opened some 11 years ago, and how modern it is. It has 200 beds for Natives and a small semi-private ward for Europeans. The maternity section, though small, copes with 40 midwifery cases per month. It is also a training school.

While touring the wards the members were shown several clinical cases of pellagra and other nutritional disorders. Diet and dietetics were discussed. One case of leprosy was exhibited.

Members were then taken to the Lecture Room, well equipped and very up to date. The Chairman, Dr. Schaffer, called a short meeting, chiefly for members to discuss the clinical cases and to ask any questions.

The minutes of the previous meeting were deferred and no routine business done. Dr. Schaffer welcomed all the members, especially Dr. Belford who had come a long distance; also Drs. Jardine and Paisley. The Chairman thanked the staff of the hospital and appreciated their kindness in permitting the Division to have its meeting in their hospital. The cases were most interesting. He heartily congratulated those concerned on the excellent work that was and is being done.

Dr. Maartens thanked Dr. Schaffer for his kind remarks and he said he wished more could be done in the Transkei to improve conditions for the Native, especially with regard to diet and feeding.

Dr. Bill Paisley said superstition was very rife and a hindrance; e.g. the male Native will not eat cabbage as it is a female food; and the female Native is not permitted to eat eggs, etc. Dr. Jardine suggested the eradication of witchcraft. The medical man sees the patient only after the witchdoctor has drained him of his substance and money. The witchdoctor's fees were very high and often exorbitant. Dr. Schaffer wished that more active steps could be taken to eradicate the witchdoctors who foster witchcraft and superstition. He stated that this hospital surely undermines the witchdoctor, since the cases admitted here, though the worst and advanced in disease, are cured.

Dr. Paisley spoke of the incidence of pulmonary tuberculosis in Natives who returned home to the Transkei after having worked and lived in the Cape. Dr. Jardine said such Natives returned home to die and are a source of infection.

Dr. Schaffer informed the meeting that the Sound Projector, 16 mm. (Bell and Howell) had arrived and was now available to the Division. Dr. Maartens requested that the Secretary write to Dr. Rijno Smit and thank him for the films, presently to be shown.

Members were then invited to the dining room for refreshments. Drinks and a delicious supper were served. The latter included tasty fresh asparagus grown in the hospital gardens.

After supper the members were shown the following three films: Leprosy; Schistosomum; Atomic Bombs on Hiroshima and Nagasaki, with resulting burns and other results. These were most instructive and the nurses and others attended.

Following the films, tea was served and with a feeling of goodwill everyone expressed their grateful thanks to the hosts and hostesses for a most enjoyable and happy evening.

PASSING EVENTS

MEDICAL LIBRARY ACCESSIONS: UNIVERSITY OF CAPE TOWN

A select list of accessions to the Medical Library for the period July to September 1950 is now available. Any members who desire copies may now apply for them to the Assistant-in-Charge, Medical Library, University of Cape Town, Mowbray, C.P.

EMPIRE MEDICAL ADVISORY BUREAU

South African medical practitioners who are thinking of visiting the United Kingdom should get into touch with Dr. H. A. Sandiford, Medical Director of the Bureau, at B.M.A. House, Tavistock Square, London, W.C.1, so that all the facilities of the Bureau will be placed at their disposal.

Medical practitioners will find the Bureau helpful in arranging accommodation as well as post-graduate courses of study.

* * * *

Dr. Martin Singer of Muizenberg, C.P., has passed the examination for admission to the Fellowship of the Royal College of Surgeons, England.

* * * *

We regret to record the sudden death of Dr. C. Resnekov in London.

IN DIE VERBYGAAN

UNIVERSITEIT VAN PRETORIA

Die volgende kandidate het aan die vereistes vir die M.B., Ch.B.-graad voldoen.

GRAAD VAN BACCALAUREUS IN GENEESKUNDE M.B., CH.B.

Alberts, Hendrik Willem.

Badenhorst, Lourentz Petrus; Beukes, Philippus Jacobus; Blake, Tower; Boonzaaier, Abraham Johannes Stefanus; Burger, Gerhardus Cornelis Cruywagen.

Campher, Lourens Ignatius; Church, Herbert Arthur; Coetzee, Albert Myburgh; Coetzee, Casparus Hendrik; Coetzee, Jan Adriaan Christoffel.

De Borggreve, Cassen; de Haas, Willem Gerard; de Klerk,

Pieter Barendse; de Vaal, Pieter Steynberg; Dinkelman, Ernst Erich; du Plessis, Alfred Johannes; du Plessis, Eugéne.

Erasmus, Erns Hendrik; Erasmus, Martha.

Faul, Helena; Ferreira, George Frederik; Fourie, David Stephanus; Friderichs, Louis Martinus.

Geyer, Frederik Jacobus; Goosen, Gert Johannes; Goosen, Pierre André; Gouws, Roelof Daniel; Güldenpfennig, Werner Maritz.

Human, Lance.

Jonker, Adolf Jacobus.

Kruger, Willem de Klerk; Kuschke, Erich Reinier Hermann.

La Grange, Johannes Petrus; Latsky, Servaas Daniel; le Roux, Jacobus Johannes; Liebenberg, Desmion Magdalena (geb. Schonken); Liebenberg, Gustav Dirk; Lottering, Barend Mattheus; Louw, Cornelis Janse; Loxton, Algernon John; Lups, Trienko.

Marais, Albert; Marais, Daniel Francois; Meter, Martinus Jan; Moolman, Johannes Zacharias; Morrison, George de Villiers; Movson, Isidore Joshua.

Nel, Jacobus Christiaan Daniël; Nel, Johannes Justinian Philippe.

Opperman, Anna Cornelia.

Pepler, Wessels Johannes; Pretorius, Johannes Stefanus.

Reitz, Cornelia Johanna; Rens, Pieter Albrecht; Rodseth, Roy Ralph; Roets, Christiaan de Wet; Rossouw, Daniël Johannes.

Sacks, Theodore Gerald; Schulz, Eleonora Joy; Schwär, Theodor Gottfried; Sevenster, Gerhardus Marthinus van Onselen; Slabbert, Johannes; Stander, Jan Christoffel.

Van Aswegen, Joachim Martinus; van Biljon, Petrus Jacobus; van den Heever, Johanna Stefanie; van der Merwe, Cornelius Visser; van der Merwe, Salmon Petrus; van der Walt, Maria Elizabeth Catharina; van Tonder, Justus Daniel; van Wyk, Johannes Petrus; van Zuydam, Hendrik Willem; van Zyl, Jacobus Visser; Verwayen, Johannes Coenradus; Viljoen, Anthonie Christoffel; Viljoen, Hermanus Mortimer; Visser, Cornelius Herculaas Charl; von der Gabelentz, Rose-Marie Elisabeth.

Wessels, Wessel Philippus; Wicks, Stephanus Johannes; Wypkema, Wypke.

OFFICIAL ANNOUNCEMENTS

MEDICAL BENEFIT SOCIETIES

Complaints have been made by Medical Benefit Societies that doctors are in the habit of disregarding their relevant contracts in respect of the period of notice of termination of their services.

Although as yet no legal action has been taken by the Societies concerned, Medical Officers are warned that they run a serious risk of legal proceedings being instituted against them should they not give the required notice.

C. A. H. Green,
Chairman,
Central Committee for Contract Practice.

HONORARY AND EMERITUS MEMBERSHIP

The Federal Council at its meeting in Johannesburg in October 1950, in accordance with By-Law 70, amended By-Law 6 of the Association's Constitution to read as follows:—

'Honorary and Emeritus Members:

6 (a) Honorary members may be elected by the Council from among those persons eminent in science in the Union of South Africa who are not legally qualified medical practitioners, if, in the opinion of the Council, they have made valuable contributions to the advancement of medical science. Honorary members shall have such privileges as may be conferred on them by Council but shall have none of the liabilities of ordinary members and shall have no vote in the affairs of the Association. Every honorary member shall cease to be such member upon a resolution of the Council to that effect passed by a majority of not less than two-thirds of those present and voting.

6 (b) Members of the Association who have reached a retiring age and who have been members in good standing for the major part of their professional careers and who, in the opinion of a Branch or Group, have served the Association actively and faithfully, may be elected to emeritus membership by the Council. Emeritus members shall retain all the rights and privileges of ordinary members but shall not be liable for the payment of any subscriptions whatsoever.'

By Order of the Council,
Medical House, A. H. Tonkin,
Cape Town. *Medical Secretary.*
1 December 1950.

AMPTELIKE AANKONDIGINGS

MEDIESE ONDERLINGE HULPVERENIGINGS

Klagte is deur die Mediese Onderlinge Hulpverenigings ingedien dat geneeshere hul kontrakte veronagsaam wat betref die nodige kennis wat gegee moet word in die beëindiging van hul dienste.

Alhoewel nog geen wettige stappe deur die betrokke verenigings geneem is nie, word Mediese Beamptes gewaarsku dat hul aan die ernstige risiko blootgestel is dat geregtelike stappe teen hul geneem sal word indien hul nie die vereistes in verband met sulke kennisgewings nakom nie.

C. A. H. Green,
Voorsitter,
Sentrale Kontrakte praktyk-Komitee.

ERE- EN EMERITUS LIDMAATSKAP

Ooreenkomstig Regulasie 70, het die Federale Raad op sy vergadering gehou te Johannesburg gedurende Oktober 1950 Regulasie 6 van die Vereniging se Grondwet gewysig om as volg te lees:—

„Ere- en Emeritus Lede:

6 (a) Erelede mag deur die Raad gekies word onder uitstaande wetenskaplikes in die Unie van Suid-Afrika wie nie wettiglike gekwalifiseerde geneeshere is nie, indien, volgens die Raad se mening, hul belangrike bydraes tot die bevordering van die mediese wetenskap gemaak het. Erelede sal sulke voorregte geniet as wat aan hul deur die Raad verleen mag word, maar sal geensins aan enige van die verpligtinge van gewone lede onderhewig wees nie en sal geen stemreg in verband met Verenigingsake besit nie. Iedere erelidmaatskap sal beëindig word indien 'n meerderheid van nie minder nie as twee-derdes van die Raad, wat teenwoordig is en wat stem, daartoe besluit.

6 (b) Lede van die Vereniging, wat 'n aftree-ouderdom bereik het en wat lede van goeie aansien vir die grootste gedeelte van hul professionele loopbane was en wie, volgens die mening van 'n Tak of Groep, die Vereniging getrou en aktief gedien het, mag deur die Raad tot Emeritus Lidmaatskap gekies word. Emeritus lede sal al die regte en voorregte van gewone lede behou maar sal geensins aanspreeklik wees nie vir die betaling van enige ledegeld hoegenaamd nie.'

Op Las van die Raad,
Mediese Huis, A. H. Tonkin,
Kaapstad. *Mediese Sekretaris.*
1 Desember 1950.

REVIEWS OF BOOKS

SIMMONDS' DISEASE

Simmonds' Disease: Extreme Insufficiency of the Adeno-Hypophysis. By R. F. Farquharson, M.B., F.R.C.P. (C). (Pp. 93 + viii with tables and figures. 15s.) Illinois: Charles C. Thomas. England: Blackwell Scientific Publications Ltd. 1950.

Contents: 1. Initial Recognition. 2. Pathogenesis and Pathology. 3. Pathology of other Endocrine Glands and other Tissues in Simmonds' Disease. 4. The Clinical Picture. 5. Summary and Conclusion. Bibliography. Index

The importance of this monograph is the satisfying fact that the exposition of the disorder is based exclusively on reports of cases which have been studied thoroughly during their lifetime and which have come to autopsy. Information from

unverified cases of Simmonds' disease has largely been omitted throughout. This produces an extremely authoritative account and forms a sound basis for diagnosis of the condition in the living.

There is ample reference to the experimental work which illuminates the physiological and pathological aspects of the disorder in man. It is interesting to find that the author gives more emphasis to loss of body weight in Simmonds' disease than does Sheehan, whose studies were done on cases of post-partum necrosis of the anterior pituitary.

The little monograph is a model of clinical description and it is hoped that it will be followed by a similar study of Addison's disease, another condition which lends itself to assessment of this type.

ETHICS OF PRACTICE

The Ethical Basis of Medical Practice. By Willard L. Sperry. (Pp. 185. $2.50.) New York: Paul B. Hoeber, Inc. 1950.

Contents: 1. Our Overlapping Professions. 2. The Specialist and the General Practitioner. 3. The Nature of Conscience. 4. Dr. Richard Cabot and 'Lord Jim'. 5. The Professions in General. 6. Codes of Medical Ethics. 7. Our Tragic Moral Choices. 8. Democratic vs. Totalitarian Medicine. 9. Telling the Truth to the Patient. 10. The Prolongation of Life. 11. Euthanasia—Pro. 12. Euthanasia—Con. 13. Reverence for Life. 14. Second Thoughts. References and Notes.

The ethics of medical practice is not entirely unrelated to its economics but in these things there is a regrettable deficiency in the instruction of medical student and layman alike.

The fundamental concern of the physician is with the patient as an individual and this creates a very special relationship between the two. There are few enough texts which cover the important problems which arise and there can be little doubt that the enduring principles of the Hippocratic oath require comment, interpretation and explanation in relation to our own times.

This little book has the blessing of Prof. J. H. Means of the Harvard University Medical School and it has the great merit of setting out many of the issues with which the practitioner is faced.

It is a volume which should be in the possession of every medical graduate and will be read with equally great profit by laymen.

GYNAECOLOGY

Textbook of Gynaecology. By J. H. Peel, M.A., B.M., B.Ch. (Oxon.), F.R.C.S., F.R.C.O.G. (Pp. 477 + xvi. With 219 figures. 24s.) London: William Heinemann, Medical Books Limited. Third edition, 1950.

Contents: 1. Anatomy, Embryology, Physiology of the Female Genital Organs. 2. Clinical Gynaecology. 3. Injuries, Anatomical Displacements and Disorders of Function. 4. Infections of the Genital Tract. 5. Tumours of the Genital Organs. 6. Sterility and the Early Complications of Pregnancy. 7. Symptoms in Gynaecology. 8. Treatment in Gynaecology.

This volume is a standard textbook of English gynaecology and embodies the principles of the London teaching in which the influence of Victor Bonney is apparent. It is primarily intended for the final M.B. student and adequately supplies all his needs. It is completely orthodox and up to date and all controversial subjects and discussions have been studiously avoided. On this score, it is an excellent book for the student.

There is a very sound chapter on embryology, simply and efficiently illustrated, and of definite value to the student. All the routine gynaecological conditions are adequately but briefly dealt with. The chapter on urinary incontinence is most up to date and embodies the most modern, accepted forms of treatment. Malignant conditions of the cervix are considered in detail and the prognosis of the various forms of therapy is dealt with. It is interesting to note, in this connexion, that the modern tendency in England is to regard anything but a grade I carcinoma of the cervix as best treated by conservative means. It is rightly pointed out that a most exhaustive investigation must be carried out before a definite diagnosis of the type of carcinoma is made.

The illustrations are reasonably good and do not compare with those in similar American publications. They are, nevertheless, simple and to the point. The chapter on therapy embodies all forms of treatment and is excellent insofar as it tends to stress to the student the importance of methods other than surgical ones. There are no references to more extensive works in this book and there are several mistakes in the index which tend to be annoying. No doubt these errors will be corrected when this textbook reaches the adolescent stage.

MODERN TREATMENT

Modern Treatment Year Book 1950. Edited by Sir Cecil Wakeley, *K.B.E., C.B.*, D.Sc., P.D.C.S., F.A.C.S., F.R.A.C.S. (Pp. 352 + viii, with 23 figures. 17s. 6d.) London: Baillière, Tindall & Cox. 1950.

Contents: 1. The Diagnosis and Modern Treatment of Bronchiectasis. 2. Surgery of the Heart. 3. The Treatment of Schizophrenia. 4. Modern Treatment of Sinusitis. 5. Keratitis and Corneal Ulcers and their Treatment. 6. Modern Trends in the Treatment of Prostatic Enlargement. 7. The Treatment of Angina of Effort. 8. The Treatment of Enuresis. 9. Aetiology and Modern Treatment of Influenza. 10. Brachial Neuritis. 11. The Modern Treatment of Iridocyclitis. 12. Modern Trends in the Treatment of Obesity. 13. The Modern Treatment of Subacute Bacterial Endocarditis. 14. The Modern Treatment of Corneal Ulcers. 15. The Diagnosis and Modern Treatment of Early Ankylosing Spondylitis. 16. Chronic Valvular Disease of the Heart. 17. A Modern Survey of Alopecia Areata and Its Treatment. 18. The Modern Treatment of Depression. 19. The Modern Trend of Treatment for Deafness. 20. Torticollis. 21. Modern Treatment of Acute Rheumatism in Childhood. 22. Diagnosis and Treatment of Tuberculosis of the Hip Joint in Children. 23. Modern Trends in the Treatment of Alcoholism. 24. Modern Trends in the Treatment of Venereal Diseases. 25. Indications for Gastrectomy. 26. Modern and post-war Trends in Fracture Surgery. 27. Modern Trends in Treatment of Anaemia. 28. Renal Calculus. 29. Causes and Treatment of Epiphora. 30. The Diagnosis and Treatment of Common Complications During Labour. 31. Modern Trends in the Treatment of Menstrual Disorders. 32. Modern Treatment of Sinusitis Associated with Allergy. 33. The Diagnosis and Modern Treatment of Sciatica. 34. Modern Trends in the Treatment of Heart Diseases. 35. The Treatment of Osteo-arthritis. 36. Drugs in the Treatment of Rheumatic Diseases. 37. Pulmonary Tuberculosis—A Survey of Treatment. 38. The Principles of Spa Treatment and its Place in Modern Medical Practice.

This Annual is intended primarily for the use of the general practitioner, and consists of a series of 38 articles on selected topics in medicine and surgery. The general design is that of a postgraduate course for practitioners conducted by physicians and surgeons on the staffs of leading hospitals in London and the English provincial towns, and the methods of diagnosis and treatment may be accepted as highly authoritative and up to date.

While the emphasis is on treatment, valuable information on pathology has been added. The Editors have been at pains to select such problems as the practitioner is most likely to encounter in his daily round, and most of the articles are models of what the short monograph should be. As an example, Dr. Baber's article on acute rheumatism in children admirably summarizes present-day knowledge on the aetiology and treatment of the disease, and contains valuable practical hints; for instance, when using sedimentation rates as a guide to progress, salicylate therapy should be discontinued for two weeks, since the drug itself lowers the rate, and may be masking an increase; this fact is not well known.

In Dr. Herbert T. Evans' chapter on modern trends in the treatment of anaemia, no mention is made of vitamin B_{12} in the treatment of pernicious anaemia, a strange omission.

The general practitioner desiring to consolidate his knowledge of modern methods of treatment should certainly have this book, which has maintained the high standard of previous editions.

RHEUMATISM

The Scourge of Rheumatism: Report of a Conference held by the British Rheumatic Association, London, September 1949. (Pp. 85. 5s.) London: William Heinemann, Medical Books Ltd. 1950.

Contents: 1. Introduction. 2. Modern Views on the Treatment of Rheumatoid Arthritis. 3. The Care of the Rural Patient. 4. The Disabled Persons Employment Act and the Rheumatic Sufferer. 5. Remploy Ltd. 6. The Problems and Employment of the Housebound Rheumatic Sufferer: The Doctor's Point of View; the Handicapped Rheumatic Sufferer; the Patient's Point of View. 7. What Voluntary Organisations are Contributing: British Council for Rehabilitation; British Red Cross Society; Home and Hospital; Home Industries and the Disabled.

This is a report of views presented by a number of speakers before a mixed audience of doctors, administrators and patients. The speakers included doctors, physiotherapists, representatives of the government and various organizations actively engaged in the rehabilitation of sufferers from 'rheumatism'.

Under the heading of 'Rheumatism' were considered rheumatic heart disease, spondylitis and rheumatoid arthritis. Britain has become very conscious not only of the personal tragedies associated with these disabilities, but also with the wider social and economic factors affecting the whole nation.

Dr. Copeman pointed out that whereas cortisone has opened up great vistas, physiotherapy is still the most important form of treatment at present. Active measures are being taken to provide centres for such therapy, the plans of carrying it to the patients' homes being hampered at present by a shortage of physiotherapists. The most important steps are in the direction of rehabilitation and employment so that the sufferers learn 'to live within the limits of their disabilities but up to the hilt of their capabilities'. The patient is given an opportunity to regain confidence and self-respect and instead of a liability and a burden becomes a happy and useful member of the community.

The report gives a rough idea of what is being aimed at and what is being done towards rehabilitating the disabled psychologically, sociologically and economically. It has gone beyond the experimental stage and should act as a source of encouragement to other countries.

ANGIOLOGY—A NEW JOURNAL

Angiology: The Journal of Vascular Diseases. Published bi-monthly under the auspices of *The Angiology Research Foundation* by the Williams and Wilkins Company, Mount Royal and Guilford Avenues, Baltimore 2, Md. Volume 1, Number 1, February 1950.

Contents: 1. Patho-physiology and Treatment of the Lower Leg Stasis Syndrome. By Gunnar Bauer, Chief Surgeon to the General Hospital, Mariestad, Sweden. 2. The Present Status of Sympathectomy in the Treatment of Vascular Diseases. By Gerald H. Pratt, M.D., F.A.C.S. 3. Peripheral Arterial Embolism. A Study of 330 Unselected Cases of Embolism of the Extremities. By Henry Haimovici, M.D. 4. Gangrene of the Heel. By Saul S. Sameuls, A.M., M.D. 5. Endarteritis Obliterans (Obliterative Endarteritis). By David W Kramer, M.D., F.A.C.P. 6. The Prediction of Thromboembolism. By Leo Loewe, M.D., Richard P. Lasser, M.D., and Maurice Morrison, M.D. 7. Lymphedema. By Geza de Takats, M.D., and Matthew H. Evoy, M.D., 8. The Arteriographic Examination of the Lower Extremity. By Darrell A. Campbell, M.D., and R. Glenn Smith. Editorial.

The appearance of a new journal of vascular diseases is to be welcomed. To-day, the general medical and surgical journals cannot possibly cope with the rapid advances in the many specialized fields. This new journal, therefore, satisfies a definite need for students and practitioners who are interested in angiology.

The editorial staff is an impressive one, being composed of well-known workers in vascular diseases from different parts of the world. The journal is to be published bi-monthly, and its first volume contains articles of great interest. Eight papers are presented, and the contents list will acquaint the reader with the extensive scope of this journal.

The papers published in the first issue definitely whet one's appetite for future issues, and it is to be hoped that the high standard of work on clinical, experimental and therapeutic measures in vascular diseases will be maintained.

The Journal is published under the auspices of the *Angiology Research Foundation* by the Williams and Wilkins Company of Baltimore. The subscription rate is $8 per volume. Single issues are listed at $1.50.

TOXICITY TESTS

The Design of Toxicity Tests (Reports on Biological Standards: VI). By W. L. M. Perry. (Pp. 51. 1s. 6d.) London: His Majesty's Stationery Office. 1950.

Contents: 1. Introduction: The Principal Types of Design available for Toxicity Tests. 2. The Quantal Response Method: The Determination of the Characteristic Curve for the Standard Preparation; The Use of the Dosage-response Line of the Standard Preparation; The Detailed Designs available for Quantal Response Assays; The Combination of Results of Repeated Assays. 3. The Graded Response Method: The Development of an Assay based on a Graded Response: Trial Assays by the Graded Response Method (2 + 2) Dose Design. 4. Summary and Conclusions.

Some of the drugs which are much used by doctors cannot be established as uniform preparations by chemical methods. Biological methods of standardization have to be used and are important in their manufacture.

The Medical Research Council in England has been responsible, in its laboratories at the National Institute for Medical Research, first on behalf of the Permanent Standards Commission of the League of Nations and now on behalf of the World Health Organization, for a large number of International Standards. They also have their responsibilities in connexion with the Therapeutic Substances Act.

This volume is the sixth of a series of Special Reports on biological standards issued by the Council. In it is presented a general study of the design of toxicity tests, and the advantages of the new kinds of tests. Various designs based on the percentage mortality produced by a drug in experimental animals are discussed.

The author recommends the use of two doses of each drug and considers how the results should be interpreted. He points out that the exact shape of the dose—mortality curve cannot be determined satisfactorily by taking the average of mortalities observed in different experiments. Toxicity tests based on the measurement of survival time are described, with the great advantage of needing fewer animals.

TISSUE AND ORGAN PHYSIOLOGY

The Physiology of Tissues and Organs. By Douglas H. K. Lee, M.D., M.Sc., D.T.M., F.R.A.C.P. (Pp. 159 + viii, with 30 illustrations (1 in colour). 30s.) Illinois: Charles C. Thomas. England: Blackwell Scientific Publications, Limited.

Contents: *Part I*: Physiology of Tissues. 1. Behaviour of Living Matter. 2. Chemical Factors in Living Processes. 3. Physical Factors in Living Processes. 4. Cell Membrane. 5. Cell Multiplication and Differentiation. 6. Nervous Tissue. 7. Muscular Tissue. 8. Epithelial Tissues. 9. Connective Tissue, Cartilage and Bone. 10. Blood. 11. Endothelial Tissues and the Fibroblastic Reaction. 12. Ageing of Tissues.
Part II: Physiology of Organs. 1. Absorptive Organs. 2. Transferror Organs. 3. Storage Organs. 4. Mechanical Effector Organs. 5. Chemical Effector Organs. 6. Excretory Organs. 7. Organs of Special Sensation. 8. Organs of Integration. 9. Organs of Defence and Offence. 10. Organs of Reproduction. 11. Embryo, Considered as an Organ. Conclusion.

The text of this book first appeared in the form of class notes when the author was professor of Physiology in the University of Queensland. It was then published in book form by the University and received such favourable notices from reviewers that the present American edition was published.

It is essentially an introduction to the usual course in Systematic Physiology. The relationship between structure and function is emphasized throughout and the student is given a unified concept of the common design and fundamental principles underlying physiological processes.

It is often stated that the principal aim of a course in physiology is to train the student to think physiologically. Far from achieving this object, the course in Systematic Physiology, more often than not, turns the student into an ephemeral fact-excreting automaton with very little knowledge of what physiology is really all about. There is no doubt that a knowledge of the basic principles of physiology, as so clearly and logically described in this book, will go a long way to correct this unfortunate tendency.

CORRESPONDENCE

THE ITALIAN SPAS

To the Editor: Very few countries can compare with Italy in the number and variety of its health-giving waters. In more than a thousand localities there are springs, or groups of springs, of every composition and temperature. Many of these have been known for many centuries and the fame that they enjoyed is witnessed by the ruins of the great baths, still to be found in many places, as well as by the innumerable writings of the early authors who praised their wonderful healing power; indeed the bibliography of Italian mineral waters is the oldest and richest which exists.

Even now Italian Spas are still very numerous, ranging from the ones possessing large and up-to-date establishments for treatment, which offer a sojourn rich in every comfort and attraction, to the simpler ones which are also well organized and equipped. These Spas are scattered all over the country:

in the Alpine valleys at the foot of the glaciers and of the fantastic peaks of the Dolomites, among the picturesque forehills of the Alps, along the chain of the Apennines, among the olive groves of Tuscany, around the Gulf of Naples and the sunny shores of Sicily. The number and variety of mineral waters, muds and grottoes, together with the perfection of their hydropathic technique, make every kind of treatment possible, so that all complaints which can benefit by hydropathic treatment, are treated in Italian Spas with waters and others applications particularly and often 'specifically' indicated for each case, and with the maximum of efficacy. To this must be added the comfortable and peaceful surroundings, the benefits of a healthy climate, and the inexhaustible beauties of the country.

It may be said that every kind of mineral water actually known exists in Italy; not only those similar to ones found elsewhere, but also many not existing in other countries or, if of the same type, having more definite therapeutic properties.

Take, e.g., the muriated or salt waters: these are widely spread also in other places, but nowhere have they, besides a high content of sodium chloride, such large quantities of iodine and bromine as those of Salsomaggiore, the great thermal resort in the Apennines near Parma. The richness of the iodine gives therapeutic qualities to these waters which have made Salsomaggiore one of the most renowned of the present day Spas. Brine baths, sprays, wet and dry inhalations and gynaecological douches, are the chief treatments in use there. Besides the magnificent State Baths, there are establishments attached to the larger hotels. Rheumatism, arthritis, gout, chronic affections of the respiratory tract and diseases of women are the ailments particularly treated at Salsomaggiore.

Other muriated springs are the famous ones of Montecatini, in which sodium chloride is combined with sodium sulphate. They are of inestimable value in the treatment of disturbances of the digestive apparatus. The waters are of different composition and temperature, and are used therefore in a wide range of treatments, above all by drinking. Montecatini, the Queen of the Italian Spas, is a fascinating garden city in the Nievole Valley in Tuscany. It is organized on a grand scale, with perfectly equipped establishments, numerous hotels and boarding houses, and many attractions for the entertainment of visitors.

A mile and half from Montecatini is the Grotto Giusti of Monsummano, a great natural grotto warmed by the steam rising from the thermal water flowing on the bottom, and divided in four large caves heated at temperatures increasing from 80° to 93° F, where the patients stay for the treatment (hot vapour bath). A bathing establishment and a comfortable hotel are attached to the grotto.

Generally speaking the so-called calcium waters are to be found in many parts of the world, but one at Chianciano has been celebrated for centuries for its curative properties, to which is due the name of *Acqua Santa* (Holy Water). This is a sub-thermal alkaline water containing calcium sulphate, the drinking of which gives a 'specific' treatment of diseases of the liver and the biliary ducts, unequalled by other medications. Nearby is the thermal gaseous Spring of Sillene (101.3° F) providing natural carbonic acid baths in running water, for the treatment of disorders of the heart and the circulation. Chianciano stands at 1,700 feet among the sunny hills of southern Tuscany and, besides the well-equipped establishments, has most comfortable hotels and boarding houses.

The arsenical-chalybeate springs are typically represented at Roncegno (1,600 feet) and Levico-Vetriolo (1,600 and 4,800 feet), health resorts in the Sugana Valley near Trento and the Dolomites, where there are large bathing establishments and hotels. The arsenical-ferruginous bath is the fundamental treatment for diseases of the blood, the nervous system and the skin, endocrine troubles and Basedow's disease, general debility, malarial sequelae and convalescence, to which these Spas owe their world-spread fame.

There are very few weakly mineralized waters of therapeutic value in the world, but the Spring of Fiuggi (total solids only 0.25 per 1,000) has a very strong healing action and a century's old reputation in cases of urinary gravel, kidney and bladder calculi, articular and internal gouty disturbances. Fiuggi is a fashionable resort in the Apennines, at 2,400 feet above sea-level and 50 miles from Rome, with many hotels and boarding-houses.

Sirmione, on the south shore of Lake Garda, has a thermal sulphur spring at 156° F, used for baths, inhalations, sprays, douches, endotympanic insufflations, in three establishments, each with an hotel attached. The chief therapeutic indications are rheumatism and arthritis, the traumatic sequelae, the diseases of the respiratory tract and rhinogenic deafness. Life at Sirmione is very pleasant and comfortable and the climate mild.

Among the most radio-active waters known are the Springs of Lurisia in Piedmont (altitude 2,200 feet), their radio-activity reaching 1,147 millimicrocuries per litre. The numerous ailments needing radio-active cures are treated at Lurisia in a newly-built establishment with a pump-room, baths, sprays, external and internal douches and an emanatorium, all close to a large hotel surrounded by an extensive park.

A very ancient kind of treatment originated in Italy is that of mud packs (*Fanghi*), not to be confused with mud baths used in other countries. These consist, according to the Italian technique, in applying mud packs to the affected parts at a temperature of 110° to 125° F. The muds are extracted from the mineral waters, of which have absorbed all the curative principles, and exercise a strong therapeutic action in muscular, articular and osseous rheumatism, arthritis, gout, neuralgia and neuritis, in the sequelae of traumatic lesions and many circulatory and visceral disorders.

There are in Italy more than 150 establishments for mud-treatment; the thousand-year-old Baths of Acqui in Piedmont are especially famous; they boast four establishments connected with first-class hotels. The Baths of Abano near Padua are equally well known; there are 32 establishments, each with a hotel attached.

These few examples may give an idea of the inexhaustible resources which Italy offers as regard mineral water treatments, so we can say as in ancient times: *Ubi thermae ibi salus.*

Guido Ruata, M.D.,
Specialist for the Spas and Health Resorts.

Italy.
23 November 1950.

RHEUMATOID ARTHRITIS COMPLICATING ADDISON'S DISEASE UNDER TREATMENT

To the Editor: As a sidelight to the review by Dr. J. Drummond on *Adrenal Cortical Hormonal and Vitamin C Therapy*, may I be allowed to report the following case which, though as yet not followed to a definite conclusion, may be of some assistance in throwing some light on a perplexing problem.

A European male, aged 52, consulted me about six months ago with nearly all the classical signs and symptoms of Addison's disease. He had lost a good deal of weight and his blood pressure was 92/60 mm. Hg, and I commenced with 10 c.c. of adrenal cortical hormone, in divided doses, daily. A few days after commencement of this treatment the patient developed acute abdominal pain and vomiting and was diagnosed as acute intestinal obstruction for which a laparotomy was performed. The condition was apparently an abdominal manifestation of Addison's disease and his adrenal cortex treatment was continued.

He developed pneumonia, deep thrombophlebitis in the right leg and pelvis, and for several weeks hopes for his recovery were very low; his circulation threatened to fail repeatedly.

For some weeks his hormone injections were doubled and recovery (with the aid of Aminophylline and Penicillin) began to ensue. He was kept on adrenal cortex 10 c.c. daily for about two months thereafter and then on to 5 c.c. daily for another three months. He is a sufferer from dyspepsia and could not be put on to sodium chloride by mouth to any extent, without developing nausea. He has now gained 25 lb. in weight and is very fit (from the point of view of his Addison's disease) with an occasional injection of 5 c.c. of adrenal cortex extract as soon as he begins to lose weight; but, and here comes the interesting sidelight, he is now developing a typical condition of rheumatoid arthritis, particularly in the joints of the hands. He did not receive any vitamin C injections during his hormonal treatment, and it is now

proposed to commence this, with his occasional adrenal injection, and to note the effect.

It would be interesting to know whether this experience is a coincidence (I hardly think so) and whether it has been noted before. In any case, will it be of any assistance in explaining the 'mystery' of the action of these hormones in rheumatoid arthritis? I put the case on record for what it is worth.

Max Cohen.

De Doorns.
27 November 1950.

PREGNANCY AND RH INCOMPATIBILITY

To the Editor: Apropos of the Question and Answer under the above title in your issue of 4 November, p. 926, may I refer you to the work of Kariher of the University of Rochester, N.Y., in which under the title of *Haemolytic Disease of the New Born* (American Journal of Obstetrics and Gynaecology, 1947, **154,** 1) he reported on his use of ethylene disulphonate. In his summary it is stated: 'Three cases are presented in which an attempt was made to prevent haemolytic disease of the new born by means of intramuscular injections of ethylene disulphonate in distilled water into the mother ante partum. In two of the cases normal infants were born while in the third case the infant suffered from haemolytic disease.'

Another report on the same subject was published by Barglow (Rocky Mountain Medical Journal, 1 November 1949). Investigational work is continuing in a number of different places and further reports no doubt will appear before long. Personal reports seem to show that normal infants have been born following the treatment suggested in perhaps three out of five cases.

The usual routine has been to begin treatment with ethylene disulphonate at the end of the third or the beginning of the fourth month of pregnancy. One injection of 2 c.c. is given weekly until term.

John Bodman.

99 Harley Street,
London, W.1.
29 November 1950.

A CHAIR OF GENERAL PRACTICE?

To the Editor: When one considers our land of vast distances and scattered population, it is clearly evident that for many years to come general practice must continue to be the foundation of the profession. Moreover, it should be recognized, on account of the great load of responsibility so often cheerfully carried single-handed by many a general practitioner in this country, that a place in the ranks should be reserved only for the best type of student.

Surely it is a self-evident truth that it takes at least as much ability, endurance and general wisdom to become a first-class general practitioner as it does to attain the promised land of specialization. The latter might conceivably be the easier road. Therefore all this talk of the declining status of the general practitioner makes alarming reading. The very word 'Status' has an ugly sound. Surely its apparently unavoidable use is a symptom of something unhealthy in a profession, graced by the adjective 'Noble', the keynote of which should always be a mutual regard for the other man's job. If the fault be in ourselves, let us attack the problem forthwith and, as is customary with us, strike at the 'worm i' the bud'.

Professor Brock rightly points out the main root cause as the method of education of students. It is perfectly true that senior medical students and interns are almost unanimous in their burning desire to become specialists. What is infinitely more alarming is that they invariably take the shortest road in the attainment of this ambition. Forgetting that the whole can only be learnt by years of patient study in general practice, they plunge into concentrated study of the part. One has seen instances of at least one evil resulting from this course—the practice of medicine being relegated to pure scientific study with a sad lack of understanding of the human element.

In attempting a solution Professor Brock acknowledges the taking part of general practitioners in student education as a highly desirable objective, but seems to find difficulty in applying the procedure. But need the application be so difficult? Has the time not come for our oldest Medical School to show the way by establishing a Chair of General Practice? It is refreshing to note that this question has emanated from the troubled mind of a thoughtful and intelligent medical student.

If such a Chair were occupied by a general practitioner, experienced for not less than 15 to 20 years and assisted by a team of honorary general practitioners, consider just a few of the infinite possibilities:—

For the first time students will have the case for general practice put to them by a general practitioner during their impressionable years. There will be a reasonable chance of restoring some balance to the teaching, for so many years uniformly in the hands of specialists. There will be help in co-ordinating the vast array of facts well-nigh disrupting the cerebral mechanism of the new graduate, who will gain first hand the knowledge (so much of which is lost to-day) of the peculiar problems which will confront him when he starts doctoring the South African public.

Above all there will be the opportunity of instilling into the student the ideals of general practice—a man's job with its joys and sorrows, its sweat and tears, its disasters and its triumphs.

A. G. Blyth.

Ladismith, C.P.
29 November 1950.

LIBRARY OF MEDICAL HISTORY AND ARCHIVES

To the Editor: The Northern Transvaal Branch has established a library devoted to the History of Medicine and has voted £100 towards initiating this project.

At the last meeting of Federal Council it was agreed that this specialized library shall be the library of the Medical Association of South Africa. This recognition, as yet, carries with it no tangible aid. We need the support of every member of the Association to make this library a success.

1. It aims at collecting a comprehensive selection of standard historical medical works.
2. It will have a special interest in the history and evolution of medicine in South Africa.
3. It will act as an archive for documents, treatises, photographs, etc., illustrating such development; it should also be the repository for copies of such cinematograph films as have already made history in this new branch of medicine.

The Library Committee seeks the co-operation and help of the existing medical libraries and would welcome token support from members by the donation of a book or two from their own private libraries. We particularly solicit the support of our Medical Schools.

We wish to interest enthusiasts at different centres who will comb their areas for matter now lost to the profession, and disintegrating. In some cases they may even act as local historians. In due course we will write to the various Branches and Divisions to this effect, but in the meantime would welcome a direct approach from members interested in this project.

One need not stress either the value or interest of medical history, nor the urgency of salvaging and preserving, while there is yet time, all that links us to our past.

We are a young country, our medical traditions and institutions as yet rest on very shallow foundations. Only by digging our roots deep into the past can we obtain that spiritual sustenance so necessary for our integrity. An insight into our past growth is needed to appreciate its present form. One can only see medicine as a whole by seeing it in continuity.

L. Klein,
Convener: Library Committee.

Northern Transvaal Branch (M.A.S.A.),
Room 28,
Administrative Building,
General Hospital,
Pretoria.
29 November 1950.

UNIVERSITY OF MICHIGAN
FEB 6 1951
MEDICAL LIBRARY

INDEX NUMBER

South African Medical Journal

Organ of the Medical Association of South Africa

S.-A. Tydskrif vir Geneeskunde

Vakblad van die Mediese Vereniging van Suid-Afrika

Incorporating the *South African Medical Record* and the *Medical Journal of South Africa*

REGISTERED AT THE GENERAL POST OFFICE AS A NEWSPAPER

Vol. 24, No. 52 | Cape Town, 30 December 1950 | Weekly 2s

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HYALASE (BENGER)

Hyaluronidase—the "spreading" factor in stable and standardised form

RATIONALE: When a solution is injected in the presence of the enzyme hyaluronidase, the tissue barrier of hyaluronic acid is broken down and the solution diffuses rapidly. There is no swelling and no pain.

RESPONSE: The potentialities of Hyalase have been investigated over a wide field. (1, 2, 3, 4, 5).

PEDIATRICS. Large amounts of fluid may be given subcutaneously to dehydrated infants when intravenous methods cannot be used. (5)

LOCAL ANAESTHESIA. Hyalase has been shown to increase the area of effective anaesthesia when mixed with procaine solutions. (6)

CHEMOTHERAPY. Where it is necessary to inject large quantities of a drug, the use of the Hyalase technique will reduce pain and facilitate absorption. (2)

PARACENTESIS. Hyalase will assist in removing viscid fluid from pleural and peritoneal cavities. (7)

STERILITY and INFERTILITY. In certain cases, Hyalase has been used successfully to induce pregnancy. (8)

HYDROCEPHALUS. Some success has been recorded on its use in this condition. The skull did not increase in size during its administration. (3)

RHEUMATOID ARTHRITIS. In pathological joints where the viscosity of the exudate appeared to be high, Hyalase has reduced this viscosity and thus aided other therapeutic measures. (9)

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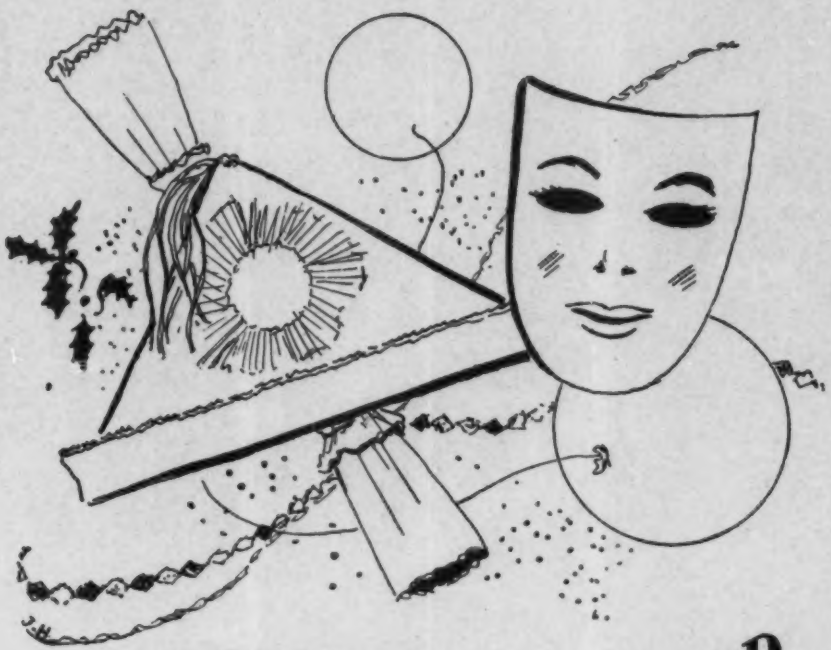

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